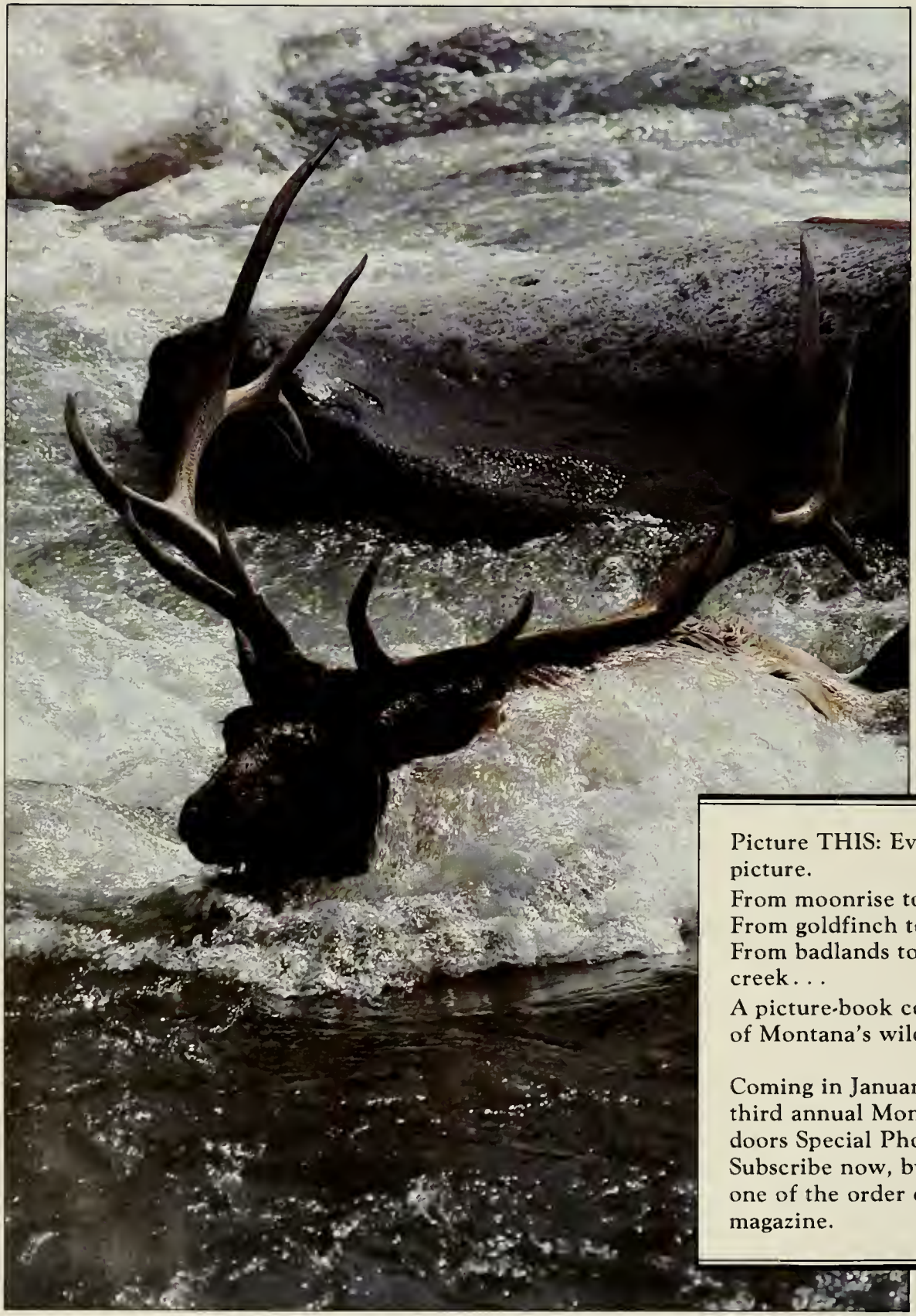
Montana Outdoors

Nov./Dec. 1983
$1.50



MICHAEL H. FRANCIS

Picture THIS: Every page a picture.

From moonrise to sunset,
From goldfinch to grass-pink
From badlands to mountain creek . . .

A picture-book compendium of Montana's wild things.

Coming in January. The third annual Montana Outdoors Special Photo Issue. Subscribe now, by returning one of the order cards in this magazine.

Montana Outdoors

Nov./Dec. 1983, Vol. 14, No. 6
(USPS 360 280)

Front Cover

The pack string has been part of the travel scene in the Rocky Mountains for a long time. Even today, millions of acres of backcountry and wilderness are accessible to hunters because of pack stock. For some—such as those pictured in Hazen Alkire's vivid painting—it's a dream hunt come true.

Back Cover

The calliope hummingbirds which grace this issue's back cover are only one of many species which will benefit from an income tax checkoff provision. Beginning with 1984 returns, Montanans will be able to make a check that will have far-reaching effects on the future of the state's nongame species.

Ted Schwinden/Governor
State of Montana

Spencer S. Hegstad/Chairman
Fish and Game Commission

Commission Members:
Earl L. Sherron/Vice Chairman
Doo Bailey
Bob Jensen
Dan Oakland

James W. Flynn/Director
Department of Fish, Wildlife and Parks

Dick Johnson/Deputy Director
Ronald G. Marcoux/Associate Director
Ron Aasheim/Administrator
Conservation Education Division
Vince Yannone/Assistant Administrator

Dave Books/Editor
Kay Morton Ellerhoff/Associate Editor
Donita Sexton/Art Director

Montana Outdoors, the official publication of the Montana Department of Fish, Wildlife and Parks, is published bimonthly (January, March, May, July, September, and November). Contributions (manuscripts or illustrations) are welcome with the understanding that the department or the editor cannot be responsible for loss or damage. All contributions will be published at the discretion of the editor. Subscription rates are $7 for one year, $12.50 for two years, $17 for three years. (Please add $3.00 per year for foreign subscriptions.) Individual copies and back issues cost $1.50 each, plus 25 cents for postage and handling. Although **Montana Outdoors** is copyrighted, permission to reprint articles is available by writing our office or phoning us at 406/449-2474. All correspondence should be addressed: **Montana Outdoors**, Department of Fish, Wildlife and Parks, 1420 E. Sixth; Helena, MT 59620. ©Montana Department of Fish, Wildlife and Parks, 1983. All rights reserved. Indexed by States' Periodical Index, 1660 Smithville Rd.; Havre, MT 59501.

Postmaster: Send address changes to: **Montana Outdoors**, Department of Fish, Wildlife and Parks, 1420 E. Sixth; Helena, MT 59620. Second-class postage paid at Helena, MT 59620, and additional mailing offices.

FEATURES

2 Just Passing Through
by Don Childress
From 200,000 to 350,000 white geese pass through Freezout Lake Wildlife Management Area.

6 Out on the Tracks
by Doug Monger
Montana's ski touring centers add a new dimension to winter recreation.

8 A Clark Fork Prognosis
by Glenn Phillips
A healthy Clark Fork River would be a landmark accomplishment for both government and industry.

13 Montana Outdoors Index
The major items appearing in 1983.

15 More Folks Behind the Badge
by Mike Aderhold
Profiles of six wardens who meet the challenges of their jobs in diverse ways.

19 Nature's Plowshare
by Clif Youmans
The yearly earth-moving ability of a single pocket gopher is impressive.

21 Interlude on Wilson Creek
by Jimmy McVicar Lotan
A packer named Charlie leads the way to an autumn elk experience that is "right tolerable."

24 Do Something Wild...Share With Wildlife
by Betsy Spettigue, drawings by Charles W. Schwartz
Beginning in 1984, taxpayers in Montana will be able to contribute to the nongame program.

26 Cooperative Programs Aid Wildlife
by Dave Books
Programs involving forest industry and the department are benefiting wildlife and recreationists in western Montana.

27 Elk Hunting, Logging, and Tradition
by Terry N. Lonner
A summary and explanation of the recommendations of the Montana Cooperative Elk-Logging Study.

32 Gallatin and Gardiner Late Season Hunts: Yearly Traditions
by Fred J. King
Gallatin and Gardiner have become exceedingly popular with elk hunters.

DEPARTMENTS

11 The Catchall
23 Readers Respond
31 Contributors

JUST PASSING THROUGH

by Don Childress

It is mid-March, and the marsh has been quiet for nearly three months. Although the southerly winds still have a crispness, they are slowly eroding the vestiges of winter. The small snowdrifts shrink each day, and open patches of water gain an ever-increasing hold in the frozen lake. Small flocks of mallards and pintails dabble in the expanses of sheetwater, marking the arrival of spring migration.

It seems to happen just as suddenly as one might imagine the "big bang" happening millennia ago. The snow geese have arrived on their annual migration to their northern breeding grounds. It's an event that awes nearly anyone who has witnessed their spectacular flight. The waves of geese seem almost endless as they make their descent to the marsh. The accompanying noise is as spectacular as the numbers, because snow geese are among the most vociferous of the goose family. This constant din is a fitting symphony to the arrival of spring at Freezout Lake Wildlife Management Area.

The logical question is: "How many are there, anyway?" The numbers vary with weather, stage of migration, etc., but from 200,000 to 350,000 white geese may be present during peak periods.

Most Montanans naturally think of the Canada goose when they talk about geese. Since the "honker" is native to this area and most Montanans have observed it in the wild, this is only natural. Although present in large numbers, the snow goose is only a migrant and just passes through the state.

The migration through Freezout Lake could more accurately be described as one of "white geese" rather than of snow geese. The term "white" is more descriptive since the migration includes both the snow goose (*Chen caerulescens*) and the Ross' goose (*Chen rossii*).

The plumage of the snow goose has two color phases: dark (or blue goose), and white. The blue goose is a color phase and not a separate species as once thought. This rare phase accounts for less than 1% of the numbers in western populations.

In "Ducks, Geese and Swans of North America," Frank C. Bellrose describes the white phase:

> The sexes are similar in appearance. Adult snow geese are completely white except for black wing tips. Occasionally the head has a rusty stain from feeding where ferrous minerals occur in bottom

HARRY ENGELS

soils. The feet and legs are rosy red, and the bill is pink with a black "grinning patch."

The immature snow goose, less strikingly apparreled than the adult, is sooty gray on the top of the head, the back of the neck, the back, and the wing coverts but is mostly white below; the wing tips are black, as in adults. The bill, legs, and feet are grayish brown.

Bellrose describes the Ross' goose:

The short stubby bill (the exposed culmen averages 1.6 inches in adult Ross' geese as compared with 2.2 inches in lesser snow geese) is without the black tomia that form the "grinning patch" in lesser snow geese. Many Ross' geese display warty protuberances between the nostrils and the base of the upper bill. The feet and legs of adult Ross' geese are rose-pink; those of lesser snow geese are scarlet.

Juvenile Ross' geese are light gray on the back of the head, the neck, and the back, and are white below. The gray is paler than in the juvenile lesser snow geese and is not as extensive. The legs of juveniles are dark gray with tan webs and toes.

Managers refer to most snow goose populations according to their origin from breeding grounds, i.e., Central Arctic or Western Arctic. The majority of the snow geese migrating through Freezout Lake are part of the Western Arctic population, which breeds primarily west of 100 degrees longitude in Arctic North America. Their nesting grounds are the barren tundra of Banks Island, Kendall Island, and the Anderson River. The Banks Island flock is the largest colony in the Western Arctic population. Here, over 90,000 breeding pairs share their land with year-round residents such as musk ox and barren ground caribou. The remainder of the snow geese using Freezout during spring are from the Wrangel Island population, off the coast of Siberia.

Population numbers vary from year to year, but the Western Arctic population is estimated at 200,000 breeding birds outside of the Wrangel flock. The Wrangel Island population has dwindled as a result of several years of near catastrophic nesting conditions. Persistent snow cover, recurring frosts, and blizzard conditions limited nesting attempts as well as affecting production. Populations have not yet responded to the degree necessary to bring them back to former levels. The population, which numbered 120,000 in 1970, diminished to 40,000 in 1976.

Ross' geese originate in the Central Canadian Arctic, primarily in the Queen Maud Gulf area, which accounts for over 95% of them. Until recently, their numbers were thought to be precariously low; however, intensive survey efforts now indicate this population has over 100,000 birds. The mixing that occurs with snow geese as they stage in the fall has made accurate counting difficult.

JIM ROMO

Ross' geese nest in colonies varying in size from hundreds to thousands of nests. This characteristic has allowed managers to use aerial photography to assess the size of breeding populations.

The Canadian Wildlife Service conducts the photographic survey every five years on major flocks. This program enables managers to evaluate the impact of oil and gas exploration on nesting colonies. Researchers have also found that snow cover on the nesting grounds greatly affects success of Arctic nesting species. Through use of Lansat satellite imagery, managers can predict the relative success of the nesting colonies by plotting the snow melt line on a given date. In years when snow melt has not progressed beyond nesting grounds, success will be poor. In good production years, the snow melt has proceeded farther north.

Banding efforts have resulted in discovery of some very interesting migration patterns in snow geese utilizing Freezout Lake. Fall populations of snow geese at Freezout are mostly from the Banks Island portion of the Western Arctic population. These geese migrate from the breeding grounds to the southern provinces of Alberta and Saskatchewan where they stage before moving on to Freezout. When they leave Freezout, their migration routes split—some travel south through the Great Salt Lake-Bear River marshes and Carson Sink of Nevada, while others take a more westerly route through the Klamath Basin of northern California. Both groups gather in California's Central Valley which offers abundant rice fields to provide the food necessary to maintain the large wintering populations.

After leaving the Alaska Peninsula, the fall migration of western Wrangel Island birds is generally coastal or across the Pacific. After arriving on the coast of Washington and Oregon, some winter in the Frazier-Skagit area of Washington, with the remainder moving down into California and wintering with the Western Arctic geese.

The spring migration for some of the Wrangel Island birds contrasts with their coastal fall migration. They migrate inland through Freezout Lake along with the Western Arctic snow geese. They move through Alberta, then northwest to Alaska before arriving at Wrangel Island.

Most Montanans look forward to spring's arrival each year. For some, a part of that anticipation is the spectacular flights of snow geese. When one knows something of their long trip, seeing their vast numbers and hearing their persistent clamor is bound to inspire awe. ■

Montana's Ski Touring Centers

OUT ON THE TRACKS

Light skiffs of snow settled gently to the ground, silently covering the autumn leaves that had so recently fallen. The barren trees outside my window were transformed into winter sculptures as I plotted my escape. All the equipment I would need was in or on my car. Extra clothing was strategically hung throughout my office drying. Now let's see—it's not even midmorning, so this afternoon's meeting could still be postponed; the seasonal summaries could be compiled at home later tonight, and all those letters could wait one more day. I contemplated, rationalized, justified. I might as well go. I wouldn't be very effective the rest of the day anyway. One more glance out the window and I was on my way. A quick stop at the boss's desk, and I'd be gone."

"What? Again? Sure. Have a good time!"

As I dashed to my car with ski clothes in tow, an amused look crossed my face and a laugh built up inside of me. "Have a good time!" Ha! I couldn't help but have a good time—I was off to one of Montana's ski touring centers.

As I made the short drive from my office to the center, I began thinking how this spot had looked a few years ago, before two enterprising individuals decided to develop it into a private ski touring center. It was nothing more than a few rustic cabins, a natural hot springs bubbling through some old corrals, and a few overgrown trails heading off through the trees into the forests beyond. My thoughts of days gone by and skiers struggling with those primitive conditions were shattered as I pulled into the freshly plowed parking lot of a modern touring center.

The first stop was the cabin at the head of the ski trails—the heart of any touring center. Here you can rent equipment for a day on the tracks, or employ an instructor to help—from teaching the beginner how to evaluate snow conditions to updating the finer points of racing technique for advanced skiers. Here a trail condition report tells me that it snowed eight inches last night and that all 18 kilometers of trails have been freshly groomed. The report also tells me the temperature is 24° F, for which the staff tells me blue wax is perfect.

After I pay a modest fee (about $4) for a day's use of the trails, I eavesdrop on an instructor ready to take out a small family group. The instructor is explaining about the equipment they will be using: properly fitting boots to keep the skier(s) warm and comfortable for the lesson, and waxless skis which will get the family into the sport with no more fuss than the tying of a lace and the clicking of a binding. As with instructors at most of Montana's touring centers, this one is a member of PSIA, the Professional Ski Instructors' Association, and a highly trained individual skilled in making skiing a pleasurable experience.

Once out on the "tracks," I realized the staff wasn't kidding when they said conditions were perfect. The blue wax gives perfect "kick and glide." The kick is achieved by putting weight on the waxed part of the ski, making the ski adhere to the snow; this gives something from which to push off. As weight is lifted off the ski, the waxed part—the wax pocket—leaves the snow, allowing the ski to glide down the track.

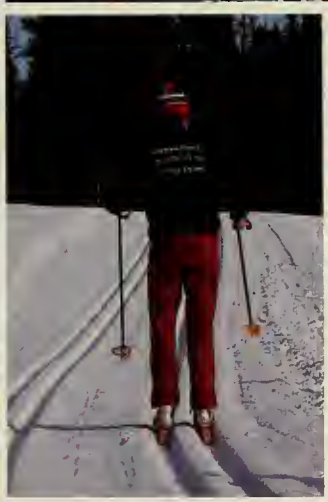
Trails at touring centers are designed and labeled for varying levels of skill. Novice trails don't change much in elevation and are a great way to acquaint the beginning skier with the sport. Trails for experienced skiers are usually longer and offer changes in elevation to challenge and enhance the experts' abilities.

Gliding along in a world of solitude, I enjoy the beauty of the area after the fresh snow. Despite the well-marked and maintained trail beneath my feet, I feel I am off in a wilderness. My thoughts are my own. It was only early December, and I was looking forward to the long winter

by Doug Monger

JOHN P. KELLY

JOHN P. KELLY



CLIFF MONTAGNE

CLIFF MONTAGNE

of skiing ahead. I thought back to something the touring center owner had told me: "When winter in Montana can be six months long, there is no reason we shouldn't enjoy all of it. Here at the center, we provide rentals, tracks, and instruction so everyone from the novice to the Olympian will not just survive winter, but enjoy it and have fun."

As I was enjoying the winter, two forms skied up to me from behind. With their one-piece, skin-tight ski suits and fluid movements, they were not unlike modern dancers on the snow. As we chatted a bit about their training, I learned the touring center was sponsoring a "fun day" the next weekend which included a citizens' race for which the two were practicing. As they skied off, I thought my place at the touring center on the weekend might better be at the horse-drawn sleigh rides, costume contest, or the winter barbeque pit instead of on the race course. One nice thing about a touring center—it offers something for everyone.

Completing one of the loop trails at the center, my legs called for a break and my stomach called for a snack. The center's lunch table provided a naturally inviting feast ready to fulfill the heartiest of expectations. As I snacked, I visited with a couple drawn to Montana by the winters. For the past several years, they had come here for vacations, and every year they undertook a different ski touring experience. Their first

continued on page 14

A Clark Fork Prognosis

BILL SCHNEIDER

by Glenn Phillips

More water leaves Montana via the Clark Fork River than from either the Missouri or Yellowstone. It is Montana's largest and mightiest river. Bearing the name of one of the West's most prominent explorers, it originates in the Deer Lodge Valley, its source formed at the confluence of Silver Bow and Warm Springs creeks near the present-day settlement of Warm Springs. From there, the river proceeds north toward Garrison, then west toward Missoula, and finally northwest before leaving the state near Heron. Such major tributaries as Rock and Flint creeks and the Little Blackfoot, Blackfoot, Bitterroot, St. Regis, Flathead, and Thompson rivers intercept the Clark Fork along its course.

But unlike other major rivers in the state, the upper Clark Fork has endured the consequences of over 100 years of intensive mining and smelting activity near its headwaters. Once a pristine artery to the Pacific Northwest, its quality has sometimes been downgraded to the point that its upper reaches could no longer support fish. Improved wastewater treatment systems completed by the Anaconda Minerals Co. in the early 1970s helped to restore water quality in the upper river, and the fishery rebounded. However, recent developments in the Butte-Anaconda area again cast doubt on the river's future.

In 1853, a member of Lt. John Mullan's party, hired to chart the course for railways through Montana, provided the following description of the area near Warm Springs:

> Moving down the valley 15 miles we came to a most beautiful prairie known as the Deer Lodge, a great resort for game, and a favorite resting place for Indians—mild through the winter and affording inexhaustible grass the year round. Like (the Bitterroot Valley) it is noted for the slightest fall of snow in it during the severest winters, and its many streams are lined with timber. Large numbers of antelope were feeding in it, and mountain sheep and goats were seen on the peaks around. Near its center is a conical mound about 30 feet high, around the base of which are innumerable springs of hot water.

The valley must have been a refreshing site to weary explorers and trappers. It is not surprising that it became a bustling early settlement.

By the 1860s, gold had lured prospectors to many areas in western Montana. However, gold miners in the Butte-Anaconda area met with little success. Butte did not come into its own as a mining town until 1875 with discovery of silver at the Travona Mine. By the late 1880s, mills were processing more than 400 tons of silver ore per day.

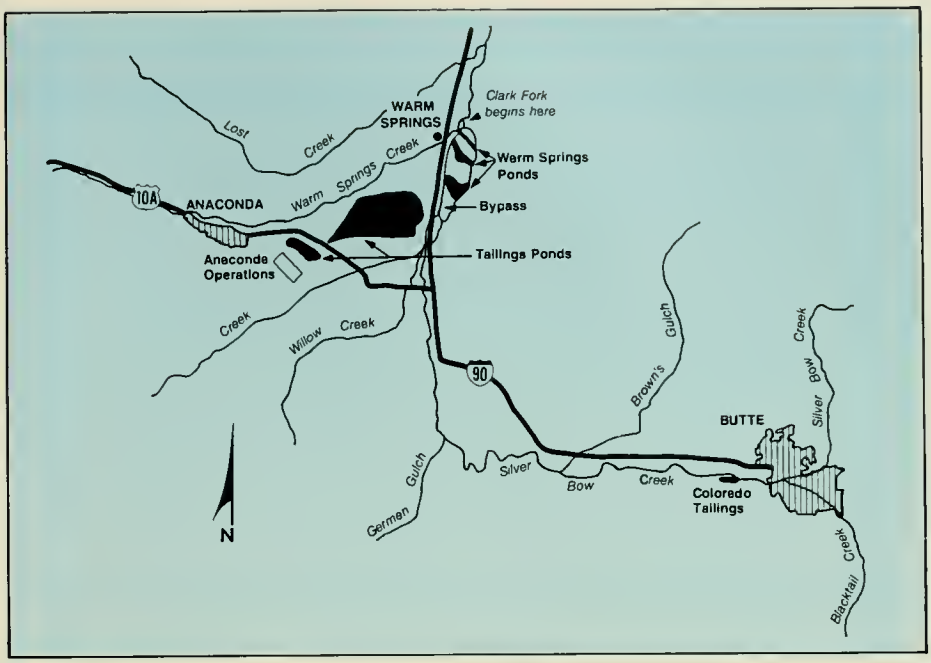
Rich copper deposits were also discovered near Butte in the 1870s,

but copper mining did not flourish in the valley until invention of the telephone and electric light created worldwide markets for copper. Its emergence as an important commodity was timely, since declining silver prices had reduced the economic importance of that element. By the mid-1880s, the Anaconda copper smelter was operating, bringing prosperity, jobs, and people to Montana.

Mining appeared here to stay, and Butte was on its way to becoming "the copper capital of the world." However, the prosperous times were not without side effects. In 1914, O.E. Mernzer of the U.S. Geological Survey, provided this less than positive description of the area near Butte:

> On the floodplains along the lower courses of Basin and Blacktail creeks there are accumulations of saline peat or peaty soil several feet in maximum thickness, and along Silver Bow Creek there are extensive deposits produced through the activities of man in the last few decades. Rapid aggradation has resulted along the Silver Bow from the obstruction of the valley by slag dumps, bridges, and other structures and to a greater extent from the overloading of the stream with various mine wastes. West of Montana Street the slag from the old Butte Reduction Works forms across the valley a wall in which there is an artificial canyon 30 feet wide and 25 feet deep and farther downstream a tunnel through which the creek discharges. At the confluence of Blacktail and Silver Bow creeks the muddy waters of the Silver Bow have built a low but extensive delta fan, around the margin of which the clear waters of Blacktail Creek find their way.

Silver Bow Creek and the Clark Fork must have seemed expendable in those days. After all, enough mountain trout for a meal could still be pulled from any of the numerous smaller streams that entered the valley from the surrounding peaks. Furthermore, major rivers such as the Jefferson and Big Hole were less than a half-day wagon ride away. Who could have predicted today's demand for recreational fishing? Perhaps a vision of the 1980s salmonfly hatch on the Madison or the reopening of the Bighorn would have altered those views of expendability.



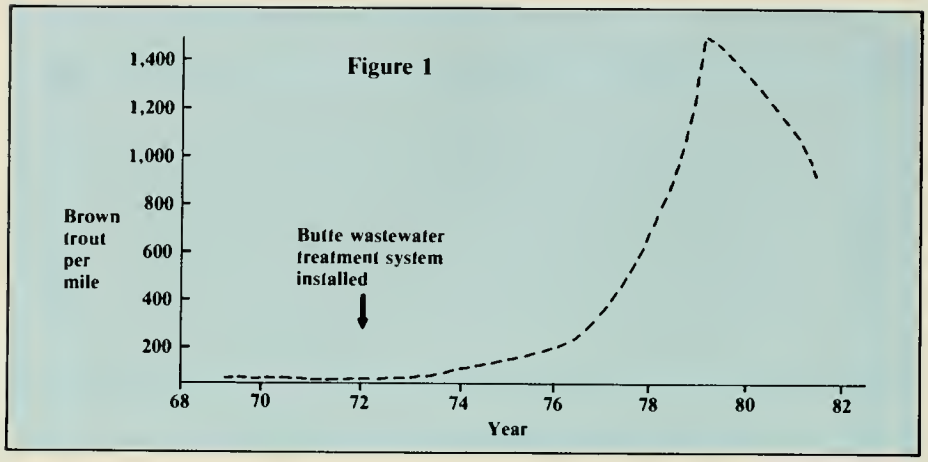
The Clark Fork suffered immensely over the next 50 years. Treated more as a tool than as a natural resource, the river was called on to transport complex industrial wastes, assimilate domestic sewage, generate electricity, and water domestic crops and animals. Although all of these activities have taken their toll on the river, mining and smelting in the Butte-Anaconda area have created the deepest scars. Mine tailings historically dumped directly into Silver Bow Creek and along its floodplain now interlace the entire system, providing a reservoir of pollutants, available under the right conditions to be released into the water.

When exposed to water and air, sulfide minerals, such as those in some mine tailings, are oxidized and form acids. Many waters have natural chemical buffers that help them resist acids (for example, bicarbonate resulting from limestone weathering). Acids added to well-buffered waters are quickly neutralized, with little resulting change in the characteristics of the water. Unfortunately, the Clark Fork is deficient in natural buffers and is vulnerable to acidic conditions.

Severe acidic conditions can, in themselves, threaten fish (see "Scourge from the Skies," *Montana Outdoors,* Sept./Oct. 1982). But the acidity of the Clark Fork is within a range that can sustain healthy fish production. Here, the problem results because there is sufficient acidity to "pull into solution" other toxic chemicals present in the tailings. As the pH dips (the lower the pH, the more acidic the water), such inhospitables as copper, zinc, and iron enter the water. Like adding sugar to your morning coffee and then stirring, the sugar particles leave the bottom of the cup and become invisibly distributed throughout the solution.

Once in the water, metals become accessible to fish and other aquatic life. When metals flow by gill surfaces as fish respire, they can damage the gills and may be taken into the fish's bloodstream and deposited in its tissues. If the concentrations become high enough, fish may die outright. Even without a fish kill, subtle effects on reproduction and growth may reduce numbers and size of fish and erode the health of the population.

Problems with metals in the Clark Fork are not confined to days past. As recently as 1969, the Clark Fork turned red because of the presence of metal hydroxides. During this episode, concentrations of copper, zinc, and iron were reported as high as 44, 107, and 73 times Montana's present water quality standards. During this severe pollution, biologists often



noted dead fish along the banks, and changes in the insect community in favor of pollution-tolerant species occurred as far as 120 miles downstream.

Early attempts to treat the river were only somewhat beneficial. They had the damaging secondary effect of "cementing" the river bottom because gypsum and metallic hydroxides precipitated downward and solidified. Consequently, the loose gravels required for successful spawning are available only in limited quantity in the upper Clark Fork. To compensate, brown trout perform their courtships in tributary streams, particularly in Warm Springs Creek, and to a lesser extent in Racetrack, Lost, and Dempsey creeks.

Beginning with initiation in 1972 of the Anaconda Co.'s primary wastewater treatment and control system for the Butte facility and installation in 1975 of a secondary treatment system, the Clark Fork's fortunes have turned upward. Lime (calcium carbonate) added to the creek neutralizes acids; ponds at Warm Springs intercept the stream, reducing water velocity and providing the slower water required for metal hydroxides to settle out. Liming is the river's lifeblood, keeping toxic metals out of solution and providing the mineral building blocks for growth of invertebrates and, subsequently, fish. However, treatment does not come easily; the company adds nearly 20 tons of lime to the river during an average month, and at one time was required to add almost 10 times that amount.

Success of the treatment is noteworthy. Brown trout populations in the Deer Lodge vicinity have increased from next to nothing in 1969 to over 1,400 catchable fish per mile by 1979 (Fig. 1). Other fishes, including redside shiner and mountain whitefish, have also increased. These improvements would have been impossible without the advanced waste treatment systems that grew from upgraded water pollution control programs.

As impressive as recovery has been, there is considerable room for improvement. During winter and spring, copper and zinc concentrations in water downstream from the Warm Springs ponds exceed those shown to impair trout reproduction. Excessive flow during spring high water necessitates diverting some water around the ponds; this diverted water does not receive the additional treatment that the ponds provide. The high metals concentrations during winter are not as well understood. The most plausible explanation relates lowered efficiency in removing metals to ice cover which reduces the capacity of the ponds. There is the additional problem of adding the lime when the river is partially iced over. Whatever the explanation, conditions in the Clark Fork are less than ideal during the critical period of the year when brown trout embryos are incubating.

The ongoing shutdown of Anaconda Minerals Co.'s Butte and Anaconda mining and smelting operations has received a great deal of attention recently. The loss of jobs and income has already had a devastating effect on these communities. Questions such as "Will the area surrounding the smelter be reclaimed?" and "What will be done to maintain or improve the water quality of the Clark Fork?" remain. Decisions made in the next few years will shape the river's future. Some of the government programs that influence the picture follow:

Superfund—The Comprehensive Environmental Response Compensation and Liability Act, popularly known as "Superfund," was passed by Congress to provide a way to clean up hazardous waste sites. Most of the $1.6 billion available results from taxes on chemicals and various petroleum products. Under this law, companies are liable for cleanup costs of problems they create. Companies that fail to follow government cleanup orders are liable for three times the cost of having the government do the work. Obviously, it is in the companies' best interests to do the cleanup themselves.

In 1981, the Environmental Protection Agency (EPA) began ranking sites for cleanup, and a list of the top 418 sites was released earlier this year. In Montana, four sites were identified, including the Anaconda smelter and Silver Bow Creek. Of the Montana sites, Silver Bow Creek topped the list, ranking 24th nationally, while the Anaconda smelter ranked 46th. By comparison, the much publicized Love Canal area was ranked 114th.

Reclamation of both the area surrounding the smelter and Silver Bow Creek affects the Clark Fork because metals in tailings could reach the river from either surface run-off or ground water. Studies at both sites will identify gaps in information and evaluate reclamation options. According to Jim Dunn, EPA's Montana Superfund coordinator, "A memo has been sent to Washington, D.C., requesting funds for further study. However, it will probably be at least two years before remedial investigations and feasibility studies are completed." It will be some time before we know whether Superfund dollars will actually be used for corrective actions.

Abandoned Mine Land Reclamation Program—Under the Federal Surface Mining Control and Reclamation Act, coal companies pay an excise tax on the coal they remove from the ground; these funds are ear-

continued on page 37

The Catchall

Frank Gjersing—Monumental Values

Ducks, geese, and other wildlife have lost a friend, a truly good friend.

On Saturday, June 11, the news stunned and saddened many Montanans: "Biologist Dies in Plane Crash." To those who knew and respected Frank Gjersing, it seemed impossible that he was gone. The Piper Super Cub in which he was a passenger struck an unmarked power line across the Missouri River northeast of Loma.

I first met Frank in the fall of 1964 when he enrolled in my zoology class at Northern Montana College. Frank was a freshman in the pre-wildlife curriculum, and I was a new biology instructor in the Science Department.

I liked Frank from the start. He was a straw-haired farm boy from the Malta country, 5 feet 6 inches tall and 135 pounds, with a likeable grin and a warm personality. He grew on me, and I soon learned to appreciate his inquisitiveness, his open manner, and most of all his deep sense of dignity, beauty, and poetry of nature's gifts of life.

You could count on getting your money's worth from Frank. His exams were a pleasure to grade, his answers on target and even beyond what was required. He had all the qualities college profs like to see in wildlife students.

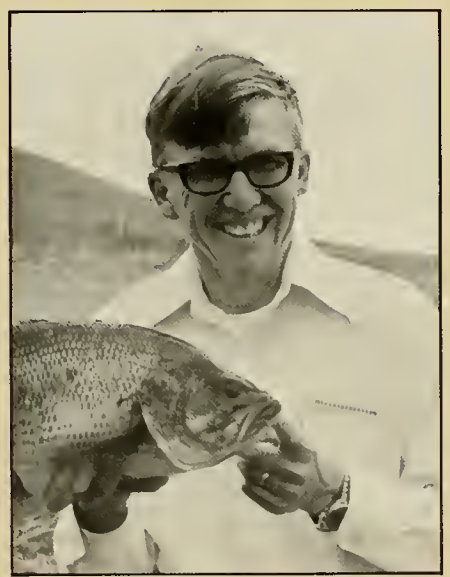
When Frank left NMC for Montana State University to complete his undergraduate and graduate degrees, I was pretty sure his master's thesis would focus on waterfowl. It did.

Frank was a wildfowler at heart. I guess only another duck hunter could truly understand how deeply Frank felt about this subject. The memory of our last duck hunt in the Chain-of-Lakes area north of Gildford is as clear as if it were yesterday. The day was blustery, and a biting wind whipped across the marsh as we set the last of our decoys in the pre-dawn darkness. We waded back to the blind and waited for the ducks to come in. As I glanced at Frank, his spirit seemed to soar beyond his body. He watched the marsh awaken, it a part of him, he a part of it. Looking my way, he grinned. That grin told me all I needed to know about how he felt.

After graduating from MSU in 1971 with his master's in wildlife management, he joined the department and was assigned to Havre as a wildlife biologist. I left the University system the same year and moved to Miles City where I became a regional information officer for the department. Even though we were now more than "spittin' distance" apart, we still managed to get together at department meetings and other events. Several times, Frank and his wife, Mary, and part of my clan headed to the northern reaches of Saskatchewan to fish for walleyes and northern pike. These trips were the sort of which memories are made, the kind of memories you relive, savor, and even dream about.

Like a cottonwood sapling, Frank matured rapidly and put incredible energy into his job. There was no doubt of his commitment to wildlife. More than anyone I ever met, he was the kind of person sportsmen like to see in a state wildlife agency.

Above all, he cared about people.



Frank Gjersing

Sportsmen, ranchers, and just plain folks admired Frank's sincerity and ability to communicate in a down-to-earth way. He received hundreds of phone calls from ranchers and sportsmen every year—usually in the evening—but he didn't complain about the extra chores that came with the job. If somebody needed help, he was always there.

His supervisor, and now Deputy Director, Dick Johnson, told me how well-received Frank's radio programs were. "A few years ago," Johnson recalled, "I was driving through Havre, after a heavy spring snow storm had caused considerable damage. The announcer was interviewing Frank and trying to get an idea of how the storm affected wildlife. Frank's answers and the tone of his voice brought out the deep feelings and knowledge he had for wildlife. I thought it was one of the best interviews I had ever heard one of our people give."

Frank was respected by his peers for both his expertise in wildlife management and for his firm stands for what he believed in. Bob Winfield, Chinook-based warden for the department, was a close friend of Frank's and his comments on how Frank's co-workers felt are difficult to improve on:

> Frank was more than just a friend and work mate. He was a hell of a man. He was not afraid to tell anyone what was good for our wildlife and what need or need not be done for the benefit of the resource. Anyone lucky enough to talk with Frank knew of the intelligence he possessed; however, his ego was just the opposite of his knowledge. If he did not know something, he was not ashamed to admit it and he would ask and research until he found the answer. Most of all, he was a giving man and asked that wildlife benefit in return.

On one of our Missouri River float trips several years ago, Frank became very philosophical one evening as we rested against a large cottonwood and sipped bourbon from a tin cup. He talked about how fast the years pile up and how a person should have something worthwhile to look back on when he came to the end of the trail—accomplishments beyond memorable hunting and fishing experiences. He was talking about developing a sense of values tempered with patience, appreciation, experience, and determination.

If Frank were here to further expound on these values, he would say something like this: "Whatever values you carve out for yourself during your short voyage on this earth, fully realize they are valid only if you pass the test. This means you have to step forward and speak out for what you believe in. Those who love the earth will find reserves of strength that will endure as long as life lasts. Certain gifts are given to those who have the grace to appreciate and respect God-made beauty. We should never forget the preciousness of such gifts. The world and its human inhabitants need to improve in this area."

That's how it was with Frank. He was a monument to what he believed in.—*Ken Walcheck, Region 7 (Miles City) information officer*

The Hunting Code of Ethics

I will consider myself an invited guest of the landowner, seeking his permission, and so conducting myself that I may be welcome in the future.

I will obey the rules of safe gun handling and will courteously but firmly insist that others who hunt with me do the same.

I will obey all game laws and regulations, and will insist that my companions do likewise.

I will do my best to acquire those marksmanship and hunting skills which assure clean, sportsmanlike kills.

I will support conservation efforts which can assure good hunting for future generations of Americans.

I will pass along to younger hunters the attitudes and skills essential to a true outdoor sportsman.—*reprinted from* Natural Resources Register, *November 1982, Michigan Department of Natural Resources*

Marcoux Wins Fly Fisher's Award

Ron Marcoux, associate director of the Department of Fish, Wildlife and Parks, received the 1983 Federation of Fly Fisher's Conservation Award. He received the honor in recognition of "his many years of effort and dedication that have contributed greatly to the magnificent wild trout fishery and fly-fishing in Montana."

In making the award, the federation noted Montana's achievements as an international example of what can be accomplished with good fisheries management. Particularly singled out were efforts on the Madison River where "fishing improves every year, with increasing angler pressure."

Originally from Maine, Marcoux came to Montana in 1963 to attend the University of Montana and Montana State University. He worked as a fisheries biologist in Dillon and Missoula, and was regional fisheries manager for the Bozeman area from 1975-81, covering the Yellowstone, Madison, Gallatin, and Big Hole River areas. He has been associate director since 1981.

Commission Honors Bird

At its August meeting, the Montana Fish and Game Commission honored Bob Bird for his more than nine years as the department's hunter safety coordinator. Bird was presented with a numbered waterfowl print by Bozeman artist Jim Wantulok.

Bird, chief of the Training and Safety Bureau in the Law Enforcement Division, has worked for the department for 24 years—in Billings, Big Timber, Miles City, and Helena.

Thanks to his efforts, the hunter education program is a success, and hunting is not only a safer sport, but also a much more enjoyable experience, for thousands of Montanans, youngsters and adults alike.

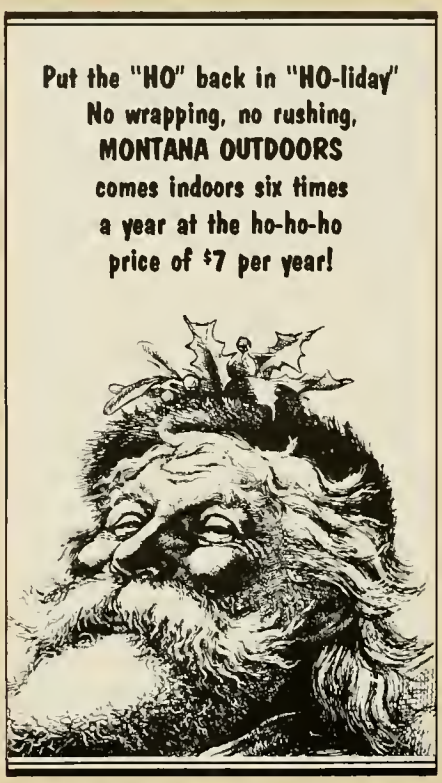
The hunter education program was recently moved from Law Enforcement to the Conservation Education Division. However, Bird will continue to assist with some workshops and seminars.

Vincent Wins National TU Award

The National Awards Committee of Trout Unlimited has selected Dick Vincent, a fisheries biologist for the department in Bozeman, as the recipient of its 1983 Trout Conservation Award in the professional category.

In making the nomination, Arthur Coffin, president of the Madison-Gallatin Chapter of TU, wrote: "His work as a fisheries biologist and the methods, standards, and policies derived therefrom have become the benchmark of excellence for others in his field to pursue."

Vincent has worked for the department since 1966, with his research and effort concentrated on the Madison River. He holds undergraduate and graduate degrees in fish and wildlife management from Montana State University, Bozeman.


Put the "HO" back in "HO-liday"
No wrapping, no rushing,
MONTANA OUTDOORS
comes indoors six times
a year at the ho-ho-ho
price of $7 per year!

Bald Eagles Gather At Glacier

For 45 years, bald eagles have annually gathered along McDonald Creek in Glacier National Park—and provided one of Montana's most impressive wildlife displays.

Each fall, hundreds of these migrating birds concentrate along the 2-1/2-mile tributary of the Middle Fork of the Flathead River. They feed almost exclusively on migrating and spawning kokanee, an introduced, landlocked form of the Pacific sockeye salmon.

The eagle gathering lasts only as long as the kokanee are available. When all of the salmon (which die after spawning) are eaten or decay, the eagles move on.

The mature kokanee usually start the 60-mile migration from Flathead Lake to Glacier around the first of September. By mid-September, there are usually a few salmon in McDonald Creek; by the end of the month, the eagles start to gather. Numbers increase through October; during the last four years, the number of eagles has peaked the first or second week in November. The historic high count was 639 eagles on Nov. 11, 1981.

To protect the eagles from disturbance, most of McDonald Creek is closed to human entry. The best place to observe the eagles is from a bridge crossing McDonald Creek, near Apgar Village in the park. Apgar is three miles from the U.S. Highway 2 West Glacier entrance to Glacier. There is parking and a small information center at Apgar. Naturalists are on duty both at the bridge and at the information center to answer questions about the park and the eagles.—*Mike Aderhold, Region 1 (Kalispell) information officer*

Wildlife Film Festival Set for April

The Seventh Annual International Wildlife Film Festival is scheduled April 11-15, 1984, at the University of Mon-

tana, Missoula. Primary purpose of the festival, again sponsored by UM's chapter of The Wildlife Society, is to encourage excellence in the making of wildlife films.

Deadline for submitting applications and films is March 23, 1984. All entries must have a predominantly wildlife theme and have been produced or released during calendar year 1983. Judging will be conducted before the festival opens. Winning entries will receive certificates and international publicity and recognition.

Additional information, rules of eligibility, application forms, and the festival's agenda are available from: Wildlife Film Festival, Wildlife Biology Program, University of Montana; Missoula, MT 59812 (406/243-5272).

Montana Outdoors Index

The major items published in *Montana Outdoors* in 1983 are indexed below. Extra copies of all 1983 issues are available at $1.50 each, plus 25 cents for postage. Some earlier back issues are available at the same price.

To inquire about or order a specific back issue, write: Back Issues, *Montana Outdoors*, Department of Fish, Wildlife and Parks; Helena, MT 59620.

BOOKS REVIEWED

Nature's Design: A Practical Guide to Natural Landscaping, by Carol A. Smyser and the Editors of Rodale Press Books (March/April 1983).

Ducks Unlimited Cookbook (March/April 1983).

North American Wild Game Cookbook, by Bill and Anita Mabbutt (May/June 1983).

Montana Wildlife, by Robert C. Gildart with Jan Wassink (July/August 1983).

Cooking the Sportsman's Harvest II, South Dakota Dept. of Game, Fish and Parks (July/August 1983).

The Montanans' Fishing Guide, Volume 1 revised and updated by Dale A. Burk; Volume 2 revised and updated by James A. Derleth (July/August 1983).

Hunting Dog Know-How, by David Michael Duffey (Sept./Oct. 1983).

Nymph Fishing for Larger Trout, by Charles E. Brooks (Sept./Oct. 1983.)

DEPARTMENT LANDS/PARKS

Judith River Wildlife Management Area—A relatively small but strategically located wildlife management area can also contribute to other forms of public recreation (Bob Varner, March/April 1983).

Savor the Summer—Visit a Park—The Black Sandy State Recreation Area is one of the newest additions to Montana's State Park System (May/June 1983).

The Heartbeat of History—History comes alive at the Rosebud Battlefield State Monument (David G. Conklin, July/August 1983).

Strike Gold at Montana's State Parks—Interpretation enhances and explains the riches at Montana's state parks (Terry Knupp, July/August 1983).

Department Lands: Freezout Lake Wildlife Management Area—The area's 12,000 acres are a land of plenty to ducks, geese, and other waterfowl and shorebirds (Dave Books, Sept./Oct. 1983).

Just Passing Through—From 200,000 to 350,000 white geese pass through Freezout Lake Wildlife Management Area on their way to breeding grounds in the North (Don Childress, Nov./Dec. 1983).

FISH/FISHING/WATER

Bronzeback Brawler—If you can believe angling enthusiasts, the smallmouth bass is tough, rambunctious, a street fighter, and a barroom brawler (Ken Walcheck, May/June 1983).

All Fishes Great and Small—A new Montana—and world—record for cutthroat-rainbow cross, the pygmy whitefish added to Montana's record fish list, and the "1982 Fishing Records Summary" (Mike Aderhold, May/June 1983).

Lake Koocanusa Kokanee—The Catch-all (May/June 1983).

Well-Healed Cutthroat—Even though the cutthroat stock at the Yellowstone River Trout Hatchery is now healthy, this has not always been the case (Jim Peterson, July/August 1983).

Shrimp and Salmon in Flathead Lake: Time Will Tell—Will the opossum shrimp help or hinder Flathead Lake's kokanee population? (Steve Leathe, July/August 1983).

On the Bighorn: Reasonable Expectations—If fishermen come to the Bighorn with "reasonable expectations," they won't be disappointed (Wade Fredenberg, July/August 1983).

Draggin' the Dragon—How a homemade dragonfly with a Lifex tail became the "fly of the moment" on a never-to-be-forgotten afternoon on Georgetown Lake (Dennice Scanlon, July/August 1983).

A Clark Fork Prognosis—A healthy Clark Fork River is a worthy goal. If achieved, it would represent a landmark accomplishment for both government and industry (Glenn Phillips, Nov./Dec. 1983).

GAME/HUNTING

Turkey Hunting Can Be Hazardous To Your Health—A first-person account of a turkey hunting trip that almost turned into a tragedy (Donald M. Garver, March/April 1983).

Big Game Drawings—Questions and Answers—Plus some of the most common mistakes made on applications and how to avoid them (May/June 1983).

Delicate Mountain Monarchs—Capt. James Cook misidentified the mountain goat, believing it was a "white bear" (Gayle Joslin, July/August 1983).

On the Horns of a Dilemma—Branch-antlered seasons cause changes in elk populations and availability, and these changes have important ramifications for the hunter (Glenn L. Erickson, Sept./Oct. 1983).

October Fever—Telling duck hunting stories is perhaps the most delightful duck hunting pastime of all (Gordon Stewart, Sept./Oct. 1983).

Getting Ready—The right kind of fitness program before the hunting season can mean a more enjoyable—and vigorous—outdoor experience (Robert W. Moon and Thomas R. Whiddon, Sept./Oct. 1983).

Rediscovering Lost Skills—The Catch-all (Mike Frisina, Sept./Oct. 1983).

The Uncommon Caribou—The Catch-all (Sept./Oct. 1983).

Interlude on Wilson Creek—A packer named Charlie leads the way to an autumn elk experience that is "right tolerable" (Jimmy McVicar Lotan, Nov./Dec. 1983).

Elk Hunting, Logging, and Tradition—A summary and explanation of the recommendations of the Montana Cooperative Elk-Logging Study (Terry N. Lonner, Nov./Dec. 1983).

Gallatin and Gardiner Late Season Hunts: Yearly Traditions—Gallatin and Gardiner have become as familiar to elk hunters as Ford and Buick are to car owners (Fred J. King, Nov./Dec. 1983).

GENERAL

Special Photo Issue—(Jan./Feb. 1983).

There Would Be No Charge—An April caravan of low-flying geese provided invaluable sights and sounds (Jeff Taylor, March/April 1983).

Along the Yellowstone: A Personal Reminiscence—The recollections of a Montanan who cares deeply about the Yellowstone (Mary Lowry, March/April 1983).

Arnold Rieder: A Profile—The Catch-all (March/April 1983).

The Unkindest Bite of All—The word "rabies" alone causes fear. But its potential dangers can be reduced by awareness of the disease, its signals, and appropriate

precautions (G. Wesley Burnett and Lisa Mathis Butler, May/June 1983).

The Emerald City of Moss—Mosses have been on earth for something like 500 million years. Despite their primitive form and structure, their life cycle or reproductive process is spellbinding (Paul R. Pacini, May/June 1983).

Jensen Begins Commission Term—The Catchall (May/June 1983).

"Fire Canoes" on the Big Muddy—The steamboat era on the upper Missouri and Yellowstone played a significant role in the West's development (Ken Walcheck, July/August 1983).

Woodland Plant or Woodland Animal?—Although their name isn't particularly attractive, slime molds have long intrigued and perplexed biologists (Steve Stephenson, July/August 1983).

Dan Bailey Fishing Day: Aug. 14—A tribute, reprinted from *Fly Fisherman* magazine (Charles F. Waterman, July/August 1983).

Become a Big Tree Hunter—The Catchall (July/August 1983).

The Silver-Tipped Sweater—A story involving Sen. Burton K. Wheeler, a grizzly bear, and three park rangers—with an important lesson for all hunters (A. David Cannavina, edited by Eldon Bowman, Sept./Oct. 1983).

The Folks Behind the Badge—Stories of six wardens who have the personalities, talents, and grit to get the law enforcement job done (Mike Aderhold, Sept./Oct. 1983).

Catch Us If You Can—Some wildlife research is best accomplished by meeting the animal on its home turf—and modern capture techniques are helping biologists close the information gap (Gary Olson, Sept./Oct. 1983).

Project WILD Takes Off—The Catchall (Sept./Oct. 1983).

Indictments Result From "Sting" Operation—The Catchall (Sept./Oct. 1983).

More Folks Behind the Badge—Profiles of six wardens who meet the challenges of their jobs in diverse, creative ways (Mike Aderhold, Nov./Dec. 1983).

Frank Gjersing—Monumental Values—The Catchall (Nov./Dec. 1983).

Cooperative Programs Aid Wildlife—Programs involving forest industry and the Department of Fish, Wildlife and Parks are benefiting wildlife and recreationists in western Montana (Dave Books, Nov./Dec. 1983).

HABITAT/ENVIRONMENT

Montana's Changing Scenes—Montana's wildlife habitat has changed a great deal since the days of early settlement (Jim Lotan, March/April 1983).

Conservation Easements: Protection for Critical Winter Range—A voluntary technique exists by which the public compensates the landowner to protect conservation values (Bruce A. Bugbee and John B. Wright, March/April 1983).

Remedies for Left-Behind Mines—The Montana Abandoned Mine Reclamation Bureau is trying to solve some of the problems left by past mining practices (Ben Mundie, Richard Juntunen, and Michael Hiel, July/August 1983).

A 1980s Dust Bowl?—There are parallels to what happened during the "dirty '30s" and what is happening now in some parts of Montana (Ken Walcheck, Sept./Oct. 1983).

NONGAME WILDLIFE

With the Sky on Their Backs—Because of the work of some dedicated "bluebirders," Montana's bluebird populations are holding their own (Dennis Flath and Art Aylesworth, March/April 1983).

Nature's Mousetrap—The weasel is more effective than any mousetrap in protecting fields and orchards against meadow mice, rats, and pocket gophers (Vince Yannone, March/April 1983).

Shorebird of the Prairie—The largest shorebird in America, the long-billed curlew can be seen in both eastern and western Montana (Tom Butts, May/June 1983).

Master of Camouflage—The diminutive flammulated owl is seldom seen and even less often correctly identified (Judy Hoy, Sept./Oct. 1983).

Nature's Plowshare—The yearly earth-moving ability of a single pocket gopher is impressive—it has been called the West's ecological equivalent of the East's earthworm (Clif Youmans, Nov./Dec. 1983).

Do Something Wild...Share With Wildlife—Beginning in 1984, taxpayers in Montana will be able to contribute to the nongame program by making a check on their income tax forms (Betsy Spettigue, Nov./Dec. 1983).

OUTDOOR RECREATION

Tripping on Wheels—Consider using a bicycle for your next trip—the distance you cover might be less, but the satisfaction will be greater (Gretchen Olheiser, March/April 1983).

Outdoors in Montana—The state's outdoor recreation plan could be about you (Paul R. Pacini, March/April 1983).

Boating Safety Education Works—The Catchall (May/June 1983).

Take A Hike—From badlands to mountains, from less than a mile to the top of Montana's highest peak—hikes into Montana's backcountry that everyone can enjoy (May/June 1983).

Out on the Tracks—Montana's ski touring centers add a new dimension to winter recreation (Doug Monger, Nov./Dec. 1983).

Out On The Tracks
continued

year was spent at an old railroad lodge converted into a touring center near Glacier National Park. After that, they were hooked. Areas with hot springs and pools highlighted the next several years, and they spent a couple of vacations at areas offering both Nordic and downhill skiing. This couple were brimming with excitement for ski touring and hoping for new adventures in the future, including telemarking and possibly even winter camping.

Enthusiasm is contagious, and I just had to get back out on the tracks. With my newly found friends, I headed out for the back loop, hoping for some of my favorite mountain views. After skiing a few "Ks" (kilometers) through a forest blanketed in last night's fresh snow, we broke out into a beautiful alpine meadow. The sort of meadow in which you would expect to see a small brook weaving its way through a splash of wildflowers, with deer browsing away the summer afternoon. The flowers are at rest under four feet of fluffy white fleece and the deer have moved on to their winter range. But the skiing is terrific. My new friends can't believe their eyes. Every trip to Montana is something new. The blue sky seems to backlight the craggy peaks in the distance, and it's like nothing they've seen before. Knowing that daylight will run out long before our enthusiasm, we turned back toward the warmth of the touring center's rustic cabins.

As I headed home after another glorious day of skiing from the touring center, I couldn't help looking back on the day and the people I'd met. The young family who came to the local touring center to learn a new sport and take advantage of the professional instructors, the racers who came to train on the well-prepared tracks, and the young couple who came to Montana's touring centers for vacation, adventure, and new experiences. Looking ahead, I thought of my next trip to a center on the upcoming weekend—sleigh rides, races, instruction, a barbeque, costumes, and, of course, those ski tracks leading the way to another great day.

● *For additional information, consult the following: "Cross Country Ski Lodges: Montana, Wyoming, Utah," by Jane Hartland and Nancy Smith Budrow (Sauvie Island Press, Route 1, Box 526; Portland, OR 97231); "The Nordic Skier's Guide to Montana," by Elaine Sedlack (Falcon Press, P.O. Box 279; Billings, MT 59103), and "Montana Alpine and Nordic Skiing Guide," (free from the Montana Travel Promotion Bureau, Department of Commerce; Helena, MT 59620).*—Ed. ■

MIKE ADERHOLD

MORE FOLKS BEHIND THE BADGE

by Mike Aderhold

The Department of Fish, Wildlife and Parks does not own the wild animals of Montana. Our state's wildlife belongs to the people of Montana. The department is merely the trustee responsible for protecting and enhancing this resource.

The work of the department is done under four constraints: (1) the will of the residents as expressed by their elected political representatives; (2) the capacity of the environment consistent with public health, safety, and other uses; (3) the requirements of individual wildlife species, and (4) the will of Montana's sportsmen as expressed by their appointed representatives, the Fish and Game Commissioners.

Today, three efforts are coordinated to discharge the state's wildlife program: (1) research, (2) management, and (3) law enforcement.

The law enforcement task is performed by 65 field wardens, five warden sergeants, seven regional captains, and six administrators and/or program managers.

Every law our wardens enforce is a product of the legislative process, and the rules and regulations they administer have been authorized, approved, or established by the Fish and Game Commission. These statutes have been designed to protect the wildlife resource, create an equal opportunity to take game animals, or to protect the health and safety of Montana's residents and their guests.

According to current job specifications, each warden is required to patrol assigned areas and to enforce state and federal wildlife conservation laws. They check fishing and hunting licenses, bag limits, and snowmobile licenses. They check for compliance with hunting laws and regulations, boating safety regulations, and park and recreation area regulations. Wardens are responsible for investigation of hunting accidents and wildlife damage complaints. They investigate and obtain evidence and prepare and present it in court. From time to time, they are required to trap and/or transplant animals, conduct lessons in hunter safety, address public groups, and assist in collection of management,

● *This is the second installment of what has turned into a three-part article. Since our next magazine—Jan./Feb. 1984—is the Special Photo Issue, watch for profiles of "More Folks Behind the Badge" in March/April.*—Ed.

Bigfork Area Warden Guy Shanks and one of his "patients"—which helped him earn his nickname, "Bird Man."

research, and environmental protection information.

In 1982, the Fish, Wildlife and Parks Law Enforcement Division, with assistance from ex-officio officers from other department divisions, made 59,752 creel checks, 56,398 game bag checks, 15,542 boat checks, and 6,956 snowmobile checks. They spent 4,025 hours working on enforcement matters in department-owned recreation areas. They issued 4,575 notices to appear in court, and 509 courtesy citations. They spent 1,179 days doing game damage work, and 416 days trapping or transplanting wildlife. They gave 223 hunter safety programs, and 150 speeches. They spent 1,241 hours in the saddle, 451 hours in small planes, and 3,049 hours in boats. In all, they drove over a million and a half miles and spent 1,781 nights away from home.

OLD PRO

7 a.m., Plentywood Area Warden Dave Cooper, 52, 27½ years service

When people ask how a warden can cover 2,000 square miles of country, I think of Dave Cooper, wily fox of the northeastern corner.

He, with a handful of other veterans, has earned the right to operate just a little differently from the "new" guys. They have invested so heavily in their turf that they are now as much a part of the community as the railroad tracks and the grain elevator. They know everyone, and almost everyone knows them.

Dave has worked with and helped the highway patrol, border patrol, sheriff, and city police, and they stand willing and ready to help him. He's on a first-name basis with the local senator and representatives, county commissioners, justice of the peace, and the city fathers, and they trust each other. He long ago memorized the county map and knows the location and best access to every farm and ranch in the area.

Hundreds of people are his eyes and ears—license agents are old friends, the mayor may be a hunter safety instructor, the highway patrolman in the next county might be an acquaintance from the days when he worked in Libby, the warden who pioneered the area is a close neighbor, influential landowners may be lodge brothers, and the court clerk is an acquaintance from church. The violator may be a former classmate of one of his children and it helps that his wife is related to lots of folks in Westby, the next town east. Several times, the community has elected Dave to the local school board, and recently he served as its chairman.

His contacts run so deeply and are so spread out, and his radar so tuned that, like Santa Claus, he's got a good idea of who's been naughty and nice. Over coffee at 7 a.m., he'll get useful information that people don't even realize they're giving, and pieces of a violation just slide together. Experience has taught Dave to size up a situation with unerring accuracy. One look at an individual's clothes, rifle, rig, and wildlife violation, and he can tell beforehand what the excuse will be.

These veterans know whose garage to keep an eye on, whose rig is packing mud to town, who is starting to give them a wide berth, and who is having trouble looking them straight in the eye.

DAY OFF

8 a.m., Big Timber Warden Ron Carlson, 35, 11 years service

"Warden!" "Warden!" "Warden!" That's what we heard from several directions. The Missoula information officer, Bill Thomas, and I had come to Gardiner to photograph and observe the state's most popular late elk hunt. Now at dawn, and one minute after shooting time, we were in the thick of it. (I should point out this was a few years ago, and the hunts are now well-controlled and carefully regulated.)

"Anybody got a flashlight?" "I dropped my knife." "Hey! I sprained my ankle." "You're not my partner." "Where's Bob?" "Get a warden." "I forgot a saw."

We heard this, and more.

Out of this chaos came Ron Carlson, the warden from Big Timber. It was his day off. He had drawn a tag in the late hunt and because he didn't have much chance to hunt during the regular season, had come out this morning with Big Timber Hatchery Manager Thurston Dotson.

In the next 45 minutes, he answered questions, settled three arguments, helped dress out two cows, and admonished a successful 13-year-old hunter to get back to his dad and their guide to learn how to dress and quarter his elk. In 60 minutes, order from chaos, with no complaints on either side. It was like this was an everyday experience.

Hank Fabich, Livingston warden who was in uniform and on duty and who had been doing the same kind of work nearby, came over to help with the dressing and loading of two unclaimed elk. Gary Ordish, another Livingston warden, riding a mule with a mind of its own, came weaving out of the draw like Don Quixote—checking licenses, dragging elk, and talking to hunters.

The "firing line" at Gardiner is a thing of the past. The hunt can now be as easy or as difficult as one wishes. We saw what was supposed to be the easy variation. By 9:30 a.m., it was all over, the area as quiet as it had been before 8 a.m. We all visited for 20 minutes or so about elk and guns, and that was it, the first and only time I ever met Ron Carlson—on his day off.

WHATEVER IT TAKES

Noon, Malta Warden Dennis Rush, 39, 13 years service

Every day is different, but the objective is always the same: to protect and enhance the wildlife resource.

Dennis Rush signed up in June of 1970 and was warden in Helena for three years before taking over the Phillips County district in the summer of 1973.

A Wyoming native and graduate of the University of Montana, he reminds me a lot of a football linebacker or better, a kickoff return specialist. He's the kind of guy who will roll up his sleeves, jump in, and do whatever the job requires.

Four years ago, then new warden Gary Benson told me the following story that illustrates the kind of work often done, but never mentioned in the job description.

The day before the deer hunting season opened in 1979, Gary and Dennis were driving south of Malta when they spotted three mature bull elk which had become hopelessly bogged down in a prairie pothole.

Using some 2x4s they had with them in the pickup, they approached the elk. Yelling and waving their jackets, they tried to spook the elk out. It didn't work.

They didn't have a rope long enough, so they carefully took down a section of drift fence and used some of the fence posts to get them over the mud and closer to the elk.

MIKE ADERHOLD

In 1982, Fish, Wildlife and Parks Law Enforcement Division officers, with help from ex-officio wardens in other divisions, made 56,398 game bag checks. Some of them were made from "field check stations," often the tailgate of a pickup.

Slipping and falling, they lassoed the antlers of one of the big bulls with a barbed wire lariat. Spooked and mucking around, the bull pulled the two cowboys into the mud. Backing the four-wheel-drive into the mud to tie off the other end of the barbed wire, they got stuck. With fence posts and more 2x4s, they jacked up the rig and got it unstuck, only to stick it again 20 minutes later. Spinning wheels, burning clutch, bellering elk, cursing wardens—it got muddier and muddier as the afternoon wore on.

By two hours after dark, the three elk were out, the drift fence was back up, the vehicle was cleaned up a little, and Dennis and Gary were exhausted. With the Missouri Breaks elk hunt opening in three weeks, was their effort wasted?

They never asked the question.

THE MUSKRAT

3 p.m., Polson Area Warden Jim Conner, 30, five years service

Raised in the Chicago area, Jim Conner set his sights on becoming a game warden when he was 13. He doggedly pursued his goal. On June 1, 1978, at age 25, he made it.

He was assigned to Kalispell for a year and three months, then awarded his own district out of Polson. Most of his area lies within the boundary of the Flathead Indian Reservation and he shares jurisdiction with the officers of the Confederated Salish and Kootenai tribes. His work is heavy with bear problems, waterfowl, and upland bird hunting, and water-based recreation.

Twenty-two months ago, Jim married Tracy Smith, then the only woman on the Polson police force. They make a good team—and about the day this article appears, they should become first-time parents. In the tight world of law enforcement, she's known as "Rosebud," and he's called "The Muskrat."

Jim's nickname is tied to his work. At least part of every month, and most of the time during the summer, he is on Flathead Lake checking fishermen and boat registration and monitoring boating safety. There isn't a warden in the state who does more of this kind of work.

Last year, wardens in Montana spent 623 days working with water safety, and there is no question they were saving lives. The Coast Guard has documented well the relationship between boating safety legislation, enforcement, and decreasing boating accidents and deaths.

During 1982, 337 boat operators were cited for not having proper life jackets, and another 48 were cited for not having life jackets on youngsters under 12 in a moving boat. Occasionally, boaters, in anger or embarrassment, shout that "if they want to take a chance of drowning, that's their business." Wardens are the wrong folks to say that to. When somebody drowns, it becomes their business. Most officers have had the uncomfortable, sad chore of notifying relatives of an accidental death, and almost every warden has assisted search and rescue teams in the always tedious, always expensive, and sometimes dangerous recovery of a drowning victim.

Checking fishermen is a study in human nature. Collectively, we have decided that those who take fish will also pay for fish management. But last year (1982), 643 anglers ducked this responsibility, and it cost them $50 apiece. Another 165 were cited for fishing with more than one rod, 82 for fishing in closed waters, and 46 for taking more than the legal limit.

The myth is that nonresidents are taking all the overlimits. The fact is: For every nonresident, almost four residents are caught stealing fish from their neighbors. Fishing limits take into account the population, production, and harvest pressure. They are reviewed annually and adjusted as needed. They are designed to protect the resource and distribute the catch.

The percentage of fishing violations compared with the number of people checked has decreased in recent years. Part of this is due to an increased emphasis on water-based enforcement. "The Muskrat's" work is a big part of that effort.

BIRD MAN

5 p.m., Bigfork Area Warden Guy Shanks, 39, 13 years service

Most wardens are obsessively interested in wildlife, and this passion makes their work more a vocation than a job.

Guy Shanks is a little like the hunting birds he loves so

MIKE ADERHOLD

Dennis Rush has been a warden for 13 years, with more than 10 of those years spent in the Phillips County district (Malta).

much—spare, well-built, in excellent condition, and born to be outdoors. He was born in the Flathead Valley and as far back as he can remember, he was interested in wildlife. As a teenager, he worked for Fish and Game on Flathead Lake and after what seemed like interminable years of schooling, became a warden in 1970. He served eastern Montana out of Sidney for more than seven years, then was transferred to Bigfork where he is now responsible for the Swan Valley.

The department cannot take care of all the orphaned and injured animals brought to our offices. Time, facilities, money, and means are all limited. The big zoos and large wild animal care parks so helpful in other states are still in Montana's future. But every warden, most of the biologists, and some of the clerical staff have nursed a few animals back to the wild, and lost a few trying.

No warden has done more with birds of prey than Guy Shanks. All on his own: four bald eagles, three or four golden eagles, several Swainson's hawks, a dozen red-tailed hawks and kestrals (sparrow hawks), a peregrine falcon, a couple of merlins (pigeon hawks), two or three Cooper's hawks, several marsh hawks, a couple of goshawks, some ospreys, one ferruginous hawk, a dozen great horned owls, and eight or nine smaller owls—a regular who's who of Montana's raptors. Over 65 birds of prey, hundreds of donated hours in a one-man attempt to help birds that give him and others so much pleasure. Only an experienced falconer can understand the contribution necessary to feed, care for, and rehabilitate so many birds. There is no extra money given, no compensated-for time, really not even thanks. Just the knowledge that one's efforts are making a difference.

CAPTAIN

7 p.m., Kalispell Warden Captain Louis M. Kis, 57, 29 years service

At seven regional offices around the state, most of the law enforcement complaints, problems, and other extraneous bucks stop at the captain's desk. The captain is a boss, comptroller, amateur analyst, father confessor, judicial interpreter, weekend lawyer, freight manager, and shock absorber. The headaches are never ending, and the rewards are few and infrequent.

Lou Kis has been a captain for 20 years, longer than any other captain, and despite the grey hair and mounting scars, he appears indestructible. He's a high-energy type, always moving, never completely satisfied. He has a flexible nature that comes from years of dealing with saints and sinners.

At his best, he can be charming, entertaining, helpful, and generous to a fault. On his bad days, he is simply hard to live with. He never has enough time, but he'll tie up the phone for hours answering a stranger's detailed questions about elk hunting or bull trout fishing. Tightfisted about information on cases in progress, he'll discuss for hours the merits of cases won and lost.

Lou earned his captain's bars after an outstanding nine-year stint as the warden in Butte. He knows wildlife law and the human weakness for stretching it, and after almost 30 years, he knows most of what his wardens will encounter.

The Captain is long on experience and opinion. With just a bit of prompting, he'll stand up, look you straight in the eye, and with an occasional sweep of the hand and jab of the finger, fill your ear.

"First, to be a good warden, you have to be honest, you have to have a strong interest in this work, and you need to be able to start your own engine.

"A successful lawman must have good judgment, be able to make a fast decision, enjoy being his or her own boss, and be able to work out his or her own problems.

"It helps to have fever for this work, to be indifferent to the hours, physical discomforts, poor pay, and occasional public abuse.

"You have to take a shotgun approach to this work. There will always be more calls and problems than you can handle. The one who can sort through the pile and keep out of hot water most of the time is the one who is going to survive in shape to enjoy retirement.

"There's no way anyone can supervise nine wardens spread over 7½ million acres. I haven't got time to look over anyone's shoulder or second-guess good people. A captain's main job is to see that we get the best possible people in the vacant positions.

"Sometimes the Fish and Game just doesn't have the answer. Take an elk or deer problem on a section of private land in the middle of a million acres of national forest land. Why, we could kill 95% of the big game in the area and if the landowner's fertilized pasture was the first thing to green up in the spring, we would still have a problem.

"How about the new folks who buy a place in the middle of nowhere to commune with nature. As soon as the first black bear walks through, or a mountain lion eats their rabbits, or the deer and elk knock down their tomatoes and eat their carrots, they call for help. Why, it's easier to fence them in than fence everything else out!

"What I really want is my wardens to be active, responsible, and to get their paperwork in on time."

Once he gets started like this, it's hard to shut the Captain down....■

ALAN NELSON

NATURE'S PLOWSHARE

by Clif Youmans

From my vantage point on a small knoll covered with lodgepole pine, I took in a panoramic view of the Pelican Valley in Yellowstone National Park. The rich yellow and brown hues sparkled and glistened from the September morning's hoarfrost. Still low on the horizon, the rising sun cast long shadows along the valley's timbered edges.

In the open valley, two hikers paused to scan the timber's edge, adjusting backpacks and water bottles. Through my binoculars, I could clearly see mounds of soil clustered next to the narrow trail. They were the result of a pocket gopher's recent excavations and although of interest to me, they exacted no response from the hikers, who had passed many such mounds in their progress through the valley. Their rest completed, they leaned into their pack straps and resumed their respective strides. They walked single file up the trail, accompanied by the incongruous, yet melodic, tinkling of "bear bells," worn as a precaution against untimely encounters with the valley's most publicized resident, the grizzly bear.

As I watched their progress, I noted how, like all human visitors to the valley, they stayed close to the hard-packed trail. Unlike the compacted soil on much of Montana's native rangeland, the ground along either side of this trail is soft, like a freshly plowed field. However, unlike a plowed field, a rich and diverse canopy of grasses and forbs covers the ground. One need only walk a few steps off the trail to feel the impediment of such soft soil to walking.

Not unexpectedly, this condition is also ecologically important. In many areas of the Pelican Valley, the upper 30 inches of soil is a homogeneous mix described as the "plow layer" by soil geographers. This plow layer is biologic rather than geologic in origin, the result of hundreds of years of pocket gopher activity. To appreciate the ecological impact of the pocket gopher in the Pelican Valley, one only need note the distribution of thick meadow vegetation, and how closely it follows that of the soil tilled, aerated, and fertilized by generations of pocket gophers.

My appreciation and interest in them stems from two summers of graduate research on pocket gophers in the Pelican Valley. However, one certainly doesn't have to visit the Pelican Valley to see pocket gophers—they are found throughout Montana.

They are small fossorial (burrowing) mammals which spend most of their lives in underground burrow systems. Members of the rodent order (Rodentia), they compose the family Geomyidae. Pocket gophers occur only in the Western Hemisphere, where they are represented by eight genera, 30 or so species, and several hundred subspecies. Widely distributed throughout Montana, they are present from mountaintop to alluvial valley floor, and from semi-arid shortgrass prairie to coniferous forest edge and mountain meadow. Until recently, only one species, the northern pocket gopher (*Thomomys talpoides*), was recognized as occurring in Montana; however another species, *Thomomys idahoensis,* has recently been discovered.

Pocket gopher mounds are frequently misidentified as having been constructed by moles. Moles, however, do not occur in Montana.

The pocket gopher has evolved many adaptations to meet the requirements of its burrowing existence. Perhaps the most distinctive physical feature is the one responsible for its name—the two long, fur-lined external cheek pouches which extend from either side of the mouth to the shoulder. These external pouches are used for transporting food. Other features which the pocket gopher has evolved include small eyes and ears; powerful and well-developed forearms and long, strong claws for digging, and a compact muscular system covered by a loosely connected skin. This loose skin allows the pocket gopher a high degree of maneuverability in its narrow feeding tunnels. Indeed, it can almost turn around within its own skin. Pocket gophers dig not only with their well-developed front claws, but also with their strong, curved incisors. They are able to gnaw earth and avoid ingesting soil because of the ability to draw their lips closed behind their protruding incisors. Their incisors, like those of all rodents, continually grow from the root. This feature compensates for considerable wear from gnawing earth.

Most people are familiar with pocket gophers because of the earthen piles of soil (mounds) they deposit when they excavate burrows. They rarely leave the safety of their burrow systems; when they do, it is generally at night to forage near an open tunnel, or to search for a mate during breeding season.

LARRY THOMPSON

As pocket gophers expand their network of feeding tunnels during winter, the soil excavated is pushed into tunnels in the overlying snow. When the snow melts, the snakelike soil casts are easily spotted.

New tunnel systems are constantly being dug, except during spring when the soil is generally too wet. Pocket gophers go to considerable effort to keep the entrances to their tunnels plugged. This decreases the chance of a predator, such as a weasel, entering the burrow. A typical burrow system, three to six inches below the soil surface, consists of a maze of feeding tunnels radiating outward like spokes of a wheel from a central chamber. This chamber is eight to 12 inches in diameter, and is used for shelter and nesting. It usually lies between 18 and 30 inches below the surface and has at least two entrances.

Except during the short breeding season in early spring, pocket gophers are highly territorial and vigorously defend their burrow systems against other pocket gophers. Pocket gophers in Montana have only one litter per year. Following mating, the female drives the male from her burrow system and tolerates no new trespassers. Gestation is approximately 18 days, with litter size varying from one to seven. Young are born hairless and blind and are nursed until they are able to forage independently, about 20 to 30 days after birth. Shortly after reaching this age, the mother drives them from her burrow system.

Pocket gophers are extremely vulnerable to predators when above ground, so the survival of juveniles largely depends on the availability and nearness of vacant burrows or suitable habitat in which to construct a new burrow system. Usually, the most desirable habitat is already occupied and a vigorous defense by the territorial adults forces many juveniles to inhabit marginal areas where survival is difficult.

Pocket gophers are selective herbivores—they prefer forbs ("weedy" species), especially underground plant parts such as corms, bulbs, and tubers. Because they do not hibernate, they must gather food in spring and summer and "cache" it. A pocket gopher cache may include such underground plant parts as corms from grasses, bulbs from lilies, and tubers from a wide variety of forbs. These plant parts are carefully stored in special underground chambers to supply winter food. A pocket gopher may have more than one cache, and often a cache may contain several pounds of plant parts.

When snow comes, pocket gophers extend their maze of tunnels into the overlying snowpack. Snow cover increases the available habitat by providing a medium in which they may forage without exposing themselves to predators. Snow cover is also important because it insulates the underlying soil, keeping it from freezing. As pocket gophers continually expand their network of feeding tunnels, soil excavated is pushed into tunnels in the overlying snow. When the snow melts, these serpentine soil casts are highly visible in Montana's mountain meadows.

Pocket gopher populations are not prone to wide fluctuations in numbers, as are many rodent populations, because of the narrow habitat constraints imposed by their specialized underground existence. Since most suitable habitat in a given area is already occupied by adult pocket gophers, the opportunity for the population to increase substantially through recruitment (the entrance of juveniles into the adult population) of the year's young is limited. Evidence suggests that maintenance of or increases in pocket gopher populations depend on recruitment and survival of the young over the winter. In the Pelican Valley, approximately 75% of a pocket gopher population dies from various causes annually. Mortality of juveniles is higher than that of adults, indicating that a suitable burrow system increases the likelihood of survival. During my field study in the Pelican Valley, I found no pocket gophers older than three years. In the absence of a high or moderate level of juvenile survival, population densities of pocket gophers rapidly decrease.

In areas where logging, grazing, fire, or other such disturbances have resulted in an increase in "weedy" species, pocket gophers may increase substantially. The increase in numbers is due to an increase in the amount of forbs which are important food, and which are associated with early stages of plant succession. Although not responsible for the original change in the vegetation, pocket gophers may slow the rate of succession to climax (the highest successional stage).

For the most part, pocket gophers perform a distinctly useful function. Their burrowing activity cultivates and aerates range soils. This is especially true in areas where heavy clay soils are compacted by livestock. Pocket gopher workings also speed up the rate of infiltration of water. On badly eroded rangelands where conditions for plant germination are nearly prohibitive (referred to as "erosion pavement" by range ecologists), pocket gopher diggings provide a favorable seed bed.

The pocket gopher has been called the West's ecological equivalent of the East's earthworm. The yearly earth-moving ability of a single pocket gopher is impressive. Reliable estimates vary, but a conservative estimate is approximately five tons of oven-dry soil per year. For those who have walked through the soft soil of areas like the Pelican Valley, the industry of this small, secretive mammal is everywhere apparent. The pocket gopher is truly nature's own plowshare. ■

GEORGE WUERTHNER

Interlude on Wilson Creek

by Jimmy McVicar Lotan

We'd just broken out over the top, and an entirely new vista now lay stretched before us. In the distance, we could see the rugged outline of the Anaconda-Pintlar range. Clouds scudded in from the west. A hawk soared below us. The sun peeked through a notch in the crest behind us. The sun was warm but the wool cruiser felt good in the autumn wind on the ridge top. We paused, partly to let the horses blow and partly to enjoy the moment. Charlie said, "Do ya know what's wrong with this world today, Jim?"

His comment broke the spell of my daydreaming. I was enjoying the view and grateful that it was my bay mare that was doing the blowing. "What, Charlie?" I replied absent-mindedly.

"There ain't no more characters left."

Now Charlie was one of my favorite characters. One of those wrinkled-up old packers who would never admit to enjoying his trade. He was downright hooked on mountain travel, but he grumbled, stewed, and cussed his way along without so much as a hint that he loved every minute of it. I dared not push him into admitting this. I merely replied, "They're not all gone, Charlie, they're not all gone."

In fact, my personal feeling is that all packers are characters. Years of packing horses and mules, miles of mountain travel, and constant contact with high ridges, clear mountain streams, aspen groves trembling in the breeze, and remote cirque basins somehow leave their mark. I've never met a packer who wasn't unique.

We nudged the pack string onward. We still had to reach wood, water, and grass before dark. And I was happy. I was where I belonged. I was on the trail heading for our favorite elk hunting camp on Wilson Creek.

I was particularly happy on this trip because we were setting up camp a week ahead of the opening day of elk season. Many years, I have barely made camp on the day before. A few times, we have pushed into camp in the wee hours of opening day. But this trip was different. A week ahead of schedule and plenty of time to set up a proper camp, complete with Charlie's traditional sun-bleached wall tent and my tipi. I really had to talk some to convince Charlie to stay in a tipi, even though he allowed as how he had secretly always wanted to try it. But I had to promise that I wouldn't tell Joe, his slow-talking friend from up the West Fork of the Bitterroot.

We were headed for a campsite on an island of trees in the middle of a wet meadow. Good grass all around, good water, and plenty of firewood. Our plans were to set up camp, get firewood cut, and then pack out empty the next day. Well, almost empty—there was a pile of tin cans left by elk hunters in the '50s before the "pack it in—pack it out" ethic became respectable (even to the squinty-eyed old packer riding ahead of me). We planned on packing out the junk left by those earlier hunters and returning the following week with my two sons and a light pack string. Coming around the bend, down off the lodgepole pine ridge, the stock started sneezing. They knew they were home. They'd been here before. I looked at my pocket watch: We had four hours before dark to set up camp. It was good to be in camp, and I looked forward to the evening.

A few minutes after we arrived, packs were pulled and horses began to shake. The smell of horse sweat hung in the air. The stock was soon watered and picketed for the evening hours. My traveling mare and Charlie's blue gelding were picketed while pack stock were hobbled. They were soon rolling in ecstasy.

We had plenty of time for setting up camp and organizing things, so we paused for a beer. "Didja see them purty-lookin' tents?" asked Charlie, wiping the foam from his mustache. Charlie, typical of most packers, was steeped in tradition. He had packed for years with the Forest Service before his retirement.

"Yes, they're the latest in dome tents, Charlie. Backpackers like 'em. They're light and comfortable. They

enable lots of folks to camp in the backcountry who don't have horses," I explained.

"Humph!" he snorted. "And a full growed-up man in short pants. How'd ya like ta see 'im ride through that patch of downed timber in that cute little outfit?"

"Takes all kinds, Charlie. Let's get that tent of yours up."

The wall tent was soon put up for gear and cooking, and the tipi pegged down and ready for sleeping. Saddles were slung over a downed log that we'd used for years. They were then covered with manties. We checked the meat pole for strength and lashed it back up between two spruce trees—just in case we connected with elk the next week. Shadows were lengthening. Charlie split wood while I fixed up hash browns and fried the steaks. The old coffee pot was bubbling pure "Norwegian gasoline."

With his plate overflowing and a grin on his face, Charlie overflowed with enthusiasm. "Tolerable, my friend. Right tolerable." Coming from Charlie, that was quite a compliment.

As we sipped coffee and relaxed, the sun slipped from view. The horses were nickering satisfaction and a bull elk bugled on the ridge above us—one of the most beautiful sounds on earth. Yessir, things were right tolerable on Wilson Creek.

Sometime after dropping off to sleep, I woke to one of the horses screaming. Somehow I managed to get into my camp mocs, grab my flashlight and handgun, and stumble out into the cold, clear night. "No problem," grunted Charlie as he spit into the darkness. "Just a bear." Charlie had been up and watching even before I was out of the sack. It was the green little buckskin that I'd heard screaming. Some of the old veterans were standing quietly and nickering for grain from the two idiots standing in the dark in their skivvies.

The following week, we started in with my boys, Eric and Leif, and more food. We didn't have to worry about excess weight and camp was already set up, complete with a full gasoline lantern (one of the best inventions of man since the manure spreader). It was a lighthearted party that left the trail head that weekend. The trip Charlie and I had made earlier removed the anxiety of setting up camp and had excited the others with stories of elk and bear. We also had the feeling of anticipation every elk hunter gets on the way into camp. To add to this excitement, about a mile from camp we saw a nice six-point bull near the trail.

We now had 10 days in which to practice what Joe Back, of Dubois, Wyo., calls Stone Age skills—hunt elk, spin yarns, and enjoy the comforts of a fall elk camp made possible by a tradition of the West—the pack string. Joe claims that the art of packing is older than history. In the 13th century, Genghis Khan explored and conquered most of what was then considered to be civilization. He did this using the pack string.

In North America, pack strings were used in the early 1800s by mountain men who found hostile Indians a problem on the river routes from St. Louis to the Rocky Mountains. In 1823, Ashley lost both men and money in trying to venture up the Missouri; after his defeat on the river, he had to reassess and make the fur trade work by land. "By land" meant pack strings from St. Louis to the Rockies—a distance of well over a thousand miles. The trip usually took three or four months. The traders packed $10,000 to $20,000 worth of trade goods in strings of 50 to 100 head of stock.

The pack string has been part of Rocky Mountain travel ever since. Today the pack string is still used by government packers, outfitters, and a few crazy people who persist in old ways. Millions of acres of wilderness and backcountry are accessible because of pack stock and characters like Charlie. I've been fortunate to have known Charlie and others like him, and to have owned what William Clark called in 1804 the most docile of all creatures—the pack horse. Of course, that docility does not come without some education of both man and beast.

I've had to blindfold a reluctant paint mare and twist her ear in order to load two quarters of elk on her back. I once lost a pack mare off the trail and had her roll over several times before a downed snag stopped her from certain death in the canyon below. Training of both man and beast can minimize, but not completely eliminate, these incidents.

Lessons learned from hard experience are well remembered, but today there are better ways to learn about the ancient art of packing. I recommend that amateurs get proper training in packing before trying their dream hunt with pack stock. Smoke Elser of Missoula, who has been a guide, outfitter, and teacher of horse packing for more than 20 years, teaches several classes each winter at his ranch near Missoula. His book, "Packin' In On Mules and Horses," co-authored with Bill Brown, is a standard text for packing courses. Smoke is also an advocate of packing stock using lightweight food, tents, and other gear. Those "purty little tents" have their merit. By cutting down on weight, more people can experience pack trips with less impact upon our beautiful backcountry. Horse packers can learn from their counterparts, the backpackers. With understanding, tolerance, and compromise, both groups can lessen impacts upon the backcountry and maintain it for others to enjoy.

Our hunt up in Wilson Creek ended with two elk for four hunters. Eric shot a nice five-point bull, and Charlie shot a young bull with a "brush rack." I would have bet good money that we couldn't have gotten a horse to where Eric's bull was quartered and hidden from noisy ravens and whiskey jacks. But by using scouts to pick a trail and lots of patience, we led two of the pack horses to the site.

The sky was a vivid blue with scattered clouds as we wound our way downstream to the trail head. We had just dropped off the ridge lined with windswept snags—whitebark pine killed by a bark beetle attack years ago. The spruce-fir forest was dusted with snow. We packed the elk on two big ranch geldings with the horns as a top pack. Camp supplies were packed on the mules raised by my stable old traveling mare. As we approached the crossing on the main fork of Wilson Creek, the clouds gathered for an approaching storm.

Charlie muttered something about horns making poor soup. He was happy with his brush rack. He was happy with his blue roan gelding. And he was happy with the fact that he was moving the winter's meat toward home in a downright practical and efficient manner.

And Jim Lotan and his boys were happy. I've always felt that happiness is the barn full of hay, a full woodshed, and a freezer full of meat. Who says that we're not still a hunting and gathering society? I was looking forward to Christmas with the family. ■

Readers Respond

Blaze Orange Law Limits Personal Choice

I enjoyed the article by Doug Scott, "New Study Shows Elk See Colors."

I do not disagree with the high visibility factor of blaze orange to other hunters, as noted by Stan Skinner. I do disagree with the mandatory wearing of blaze orange on two counts.

First, hunters are arbitrarily forced to purchase blaze orange garments of at least 400 square inches to meet Montana requirements. Some states even require you to purchase a blaze orange hat in addition to the 400-square-inch garment. Blaze orange is not a particularly attractive color choice in clothing. Use of these garments does not generally go beyond the five to six weeks that our hunting seasons last each year.

Second, I resent that I must purchase and wear these garments or be subject to a legal penalty. This approach by any branch of government is wrong and probably unconstitutional, as was the case of mandatory helmet laws for motorcyclists. This is not to say that blaze orange for hunters or helmets for motorcyclists are not viable safety features for their intended purposes. It is to say that in either case—blaze orange for hunters or helmets for motorcyclists—a person should not lose his basic right to freedom of choice.

I feel that the freedom of choice should exist for hunters just as it does for motorcyclists. Still, by personal choice, most motorcyclists continue to wear helmets.

As for hunters, I feel that if the wearing of blaze orange were simply recommended for their personal safety in the field, most would continue to wear the color—but by personal choice. Unfortunately, as with the mandatory helmet laws, the matter will probably end up in the courts at wasteful costs. There is just too much controversy going on for it not to end up that way.

The easiest solution is to recommend use of this color on the merits of its obvious safety benefits and let go of the mandatory, punishable by law approach. *—Dan Atkins; Bonner, Mont.*

Rabies May Not Be Fatal

The article "The Unkindest Bite of All" in the May/June 1983 *Montana Outdoors* strongly implies that rabies is always fatal once the disease develops. This may not be entirely true. About 15 years ago, there was a report in the national news of a human who recovered from rabies. Also the following reports in the scientific literature may be of interest:

A report by Snipes et al, "BHT Inactivates Lipid-Containing Viruses," published by *Science* (188: 64-66) in 1975 relates that BHT (butylated hydroxytoluene) is toxic to a class of lipid-coated viruses that includes rabies, mumps, measles, and herpes.

A report by Banic, "Prevention of Rabies by Vitamin C," published by *Nature* (258: 153-154) in 1975 tells of treating experimental animals with 100 milligrams of vitamin C per kilogram of body weight twice a day for seven days after inoculation with rabies virus. The treated animals had a mortality rate of 35.42%, while the controls (which received a salt water injection, rather than vitamin C) had a mortality rate of 70%.

I think this is significant. If a pet of mine developed rabies, I would treat him with vitamin C and BHT. Of course, only a physician is qualified to recommend treatment for humans.—*John G. Tietz; Hamilton, Mont.*

Catching The One That Got Away

I read with interest the letter "Dumb Animals?" in your May/June 1983 issue, about the deer that took to the water and outwitted the dog.

It brought to mind not a story concerning the intelligence of the animal, but rather the ignorance of the fisherman. I was fishing for black bass right from shore on one of my favorite local lakes. Many times, I had filled my stringer with my limit in the 2- to 5-pound class. On this particular day, a man was fishing from a pier about 100 feet away when suddenly his rod arched and he was into a real lunker.

I picked up my net and went to help him, when the line went limp and I was looking at a very despondent fisherman. I turned to walk back when I saw a large red and white bobber surface—about 20 yards out. It moved laterally across the water, disappeared for awhile, then surfaced about 10 feet from where it had gone down.

I knew right then this fellow was a relative neophyte to the sport of fishing.

First off, the big bobber was not what you used if you expected to outwit those old mossbacks. As soon as they would feel that drag, they would drop your night crawler or minnow in a flash. I asked him how he had attached the bobber, and he said he had tied it to that little wire hook on the bottom of the bobber.

I quickly realized that because of his lack of knowledge, he might have made it possible to still get that fish. Without a word, I ran for my tackle box, picked up my rod, attached a medium-sized sinker, and put on a treble hook. I knew if that bobber was fastened like he said it was, all I had to do was drop my weighted hook across the line between the bobber and the fish, and then draw it up slowly until my hook was just below the bobber.

I retrieved the second cast slowly, and when the hook caught the line, I pulled it up tight and started playing the fish. Telling him to handle my net, I brought in a nice 4½- to 5-pounder. He had his fish—plus his old bobber tightly secured. He was thanking me all over the place, and I said, "My friend, you are probably the only fisherman who can go home and brag about catching 'the one that got away!' "—*Ray Bell; Mequon, Wis.*

Let the landowner know you appreciate access. Give a gift that conveys your thanks all year—
MONTANA OUTDOORS

One Year—$7

Fill 'Em Up

Who wants to waste shelf space with a lot of half-filled binders? I certainly don't, and I suspect nobody else does either.

With six more wires, your binders will hold 12 issues!

Where to get the wires? Model airplane hobby shops sell three-foot lengths of piano wire for just a few cents. Electricians' pliers will cut the wire easily. I found that by using an original wire as a pattern, there was just one-half inch left over from each long section I purchased.

You probably will not publish this as it could possibly cut your binder sales in half. Yet it may actually increase sales since most people hate to waste shelf space.

I like your editorial policy. Keep it up.—*Wes Bell; Lewistown, Mont.*

P.S. My check for $10 is enclosed; please send me two more binders.

Do Something Wild... Share With Wildlife

western meadowlark

by Betsy Spettigue
drawings by Charles W. Schwartz

Suddenly, Montana has a Nongame Wildlife Program based on an income tax checkoff system which will fund education and research efforts to teach and learn more about Montana's nongame wildlife.

"Nongame wildlife." Some kind of jargon?

If we're hunters or persons who fish, we know about *game.* We're concerned about deer, elk, antelope, trout, and ducks.

If we're environmentalists, we're caught up in the plight of *endangered* species: the peregrine falcon, gray wolf, whooping crane, black-footed ferret.

If we're trappers, we track the harvest of *fur-bearing* animals: beaver, mink, muskrat, bobcat.

And if we're any or all of the above—or simply appreciate nature—we should be concerned about nongame wildlife.

Nongame wildlife includes such birds, reptiles, mammals, and fish as the bluebird, painted turtle, pika, pelican, and sturgeon chub that traditionally have not been hunted or harvested. In Montana, endangered and threatened species are not on the nongame list since federal programs already manage, protect, and conduct research on these species.

Conservation of nongame animals is not new, although its benefits in the past were usually incidental to some other goal: For example, game conservation efforts by sportsmen saved wetlands for ducks, *and* benefited nongame animals, such as yellow-headed blackbirds and great blue herons.

"Wildlife conservation cannot be restricted to a certain species or a few species," said Dennis Flath, nongame biologist for the Department of Fish, Wildlife and Parks since 1974. "The ecological system is a magnificent and very complex system of checks and balances. When all the pieces are in place, it runs like a finely tuned clock. But when you compromise some of these checks and balances, you are in trouble. When species of animals are lost, the whole system suffers—it becomes destabilized."

In the past, nongame species declined to the threatened or endangered point before federal funds could be tapped for rescue efforts. But it's better strategy to begin managing nongame species *before* they become threatened. "Trying to bring a species back from possible extinction is difficult, as well as time consuming and expensive," continued Flath.

Nongame conservation is remote from anti-hunting and anti-trapping movements. It's neither in competition with, nor a replacement for, game management. But it can use as its foundation what is known about game management. Recognizing that fact, the 1983

Montana Legislature enacted a tax law to fund a state Nongame Wildlife Program. By checking a box on the state income tax form, taxpayers can contribute $2, $5, or $10 to the program.

The current annual budget for Montana's nongame program is $53,000, according to Flath. The new source of funding is good news at a time when there is growing awareness of the importance of researching and managing nongame animals. Flath estimates the checkoff program will generate from $60,000 to $100,000 per year.

The money will be strictly controlled and can be used only for research and education. Before any money can be used for management, the projects must be approved by the Legislature. No money can be used before July 1, 1985. Also, nongame funds cannot be used to purchase land. Under a sunset clause, in 1987 the Legislature will review the checkoff program and decide whether to continue it.

Montana isn't the first state to recognize the importance of nongame wildlife. Since the idea was developed in Colorado in 1976, 28 states have instituted income tax checkoffs for nongame funding programs. Taxpayers in Colorado have contributed over $3.5 million since the checkoff's initiation. Currently, 33 state wildlife agencies and 100 nongovernment groups belong to the Nongame Wildlife Association of North America.

One of the priorities of the nongame program is to inventory the nongame species and construct a species list. "The question we want to answer is: 'What is the full spectrum of wildlife able to be accommodated on the variety of habitats which comprise Montana's land base?' " Flath said.

pika

"Aldo Leopold said that the first precaution of intelligent tinkering is to keep all the pieces. We have to make sure we keep all the pieces when managing our wildlife," Flath emphasized. In Montana, those pieces include such species as grebes, loons, and cormorants. Montana's spotted bat is one of the rarest animals in North America.

Fish and wildlife biologists are looking more closely at nongame species for a number of reasons. One of the big advantages of studying smaller nongame animals is that they can serve as "indicators" of a problem before it gets out of hand, Flath said.

Elk may have a life span of about 12 years, for example. If biologists waited to see the effects of an ecological problem on several generations of elk, it would require many years of study. A shrew, on the other hand, has a life span of about 16 months, and four or five litters of young and two to three generations in a summer.

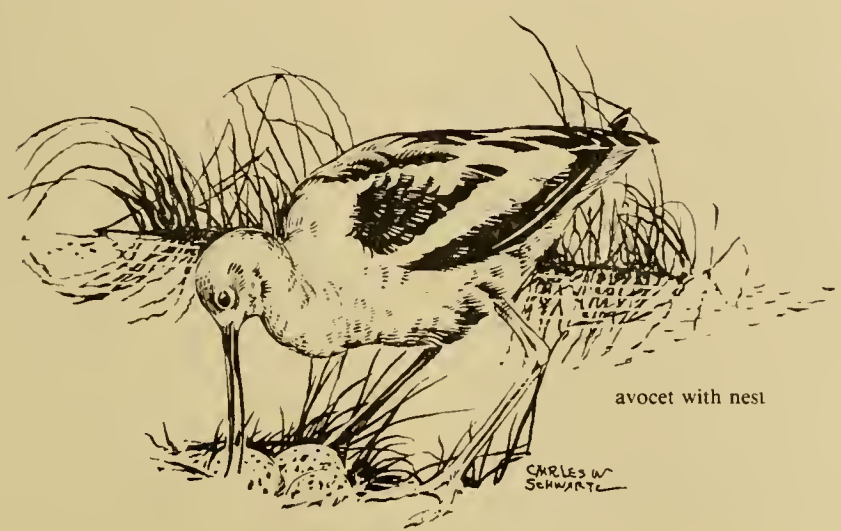
These small animals with the short lives are front runners that can tell us whether we have an ecological problem. We see the impact of the problem quickly, and then can start identifying the problem itself, according to Flath. A healthy ecological system is its own best control.

A stable ecosystem with all species in balance works to prevent sudden explosions of one species. Flath pointed to Idaho's problem last year with jackrabbits overrunning the countryside. "Eruptions in the population of any small animal can be devastating. You can start poisoning the animals, but then you're treating the symptom rather than the cause—and you're also dealing with such things as the secondary effects of the poisons."

More than 30 years ago, conservationist-philosopher Leopold recognized the problems of ecological balance and the importance of nongame wildlife. He called attention to the fact that wildflowers, songbirds, and most small animals have no economic value. Only about 5% can be sold, fed, eaten, or otherwise put to economic use. "Yet these creatures are members of the biotic community, and its stability depends upon their continuance," he wrote.

What is the value of a bluebird, painted turtle, pika, pelican, or sturgeon chub? Biologists don't know all the answers, but they do know that every piece in the ecological puzzle is important.

The Nongame Wildlife Program represents a second chance for certain wildlife species that have been neglected over the years. Considering the lack of funds from other sources, it may be their only chance. Do something wild...share with wildlife! ■



avocet with nest

Cooperative Efforts Aid Wildlife by Dave Books

Several cooperative programs involving forest industry and the Department of Fish, Wildlife and Parks are currently benefiting wildlife and recreationists in western Montana. These programs vary from game management agreements that help regulate hunting pressure on forest lands to cooperative landowner agreements that provide public access to key recreational resources.

The primary thrust of the game management agreements is to limit vehicle access in areas where extensive roading has made big game populations vulnerable to overharvest. Through selective road closures and creation of "walk-in" areas, good hunting opportunities can be maintained throughout large blocks of elk habitat.

According to John Firebaugh, DFWP regional wildlife manager in Missoula: "We didn't really have much of a road problem prior to 1960. Road access was needed to get hunters into forested lands so that adequate harvests could be obtained. But road building on forest land has increased greatly since then; every year, hunters can drive to more and more remote places. This has resulted in shorter and more restrictive hunting seasons to keep local elk herds from being overharvested. In some cases, we've had to ask landowners to limit motorized access to maintain habitat security for the elk and to avoid the need for further hunting season restrictions."

Several forest product companies in western Montana, including Plum Creek Timber Company, Inc. (formerly Burlington Northern Timberlands), Champion International, and St. Regis Paper Company, are cooperating in these road closure programs. According to Bob Boeh, director of land management for Plum Creek Timber Company, public acceptance of the road closures has been generally good. But he emphasized that it's important for people to know that the closures aren't to lock the public out, they are to perpetuate quality hunting by restricting vehicle access. Most serious hunters like the walk-in areas because they know they won't spend a morning walking into a remote area only to have a four-wheel-drive vehicle come rumbling by.

Much of the data on the impacts of logging and roading on elk populations have stemmed from an ongoing cooperative elk/logging study begun in about 1970 (see related article on page 27). The DFWP, as well as several other state and federal agencies, private landowners, and forest product companies are cooperating with the University of Montana School of Forestry on the study. One of the study areas, designated the Blackfoot Special Management Area, encompasses approximately 50 sections of forest land east of Missoula. Both Plum Creek Timber Company and Champion International have cooperated in the elk/logging study. Plum Creek has helped fund the study for the past four years.

Jim Bentley, land manager for Champion International's Rocky Mountain Timberlands Operation headquartered in Milltown, has been pleased with the results of cooperative game management agreements between his company and DFWP. "We're trying to achieve an equitable road policy that allows forest management activities and yet accommodates the department's goals of big game management," he said.

Champion has installed about 150 gates on their forest roads at a cost of roughly $750 per gate. Closures for game management purposes are worked out cooperatively with DFWP, and signs indicating the cooperative nature of the closures and their purposes are posted.

St. Regis Paper Company, which manages about 200,000 acres of forested land in western Montana, also cooperates in road closure programs. Because some logging jobs are active in the fall, St. Regis prefers the use of road closure signs to gates which have to be opened and closed by forest management personnel. Company officials stress that public cooperation is essential if wildlife management goals are to be achieved through the road closures.

Not all cooperative agreements between forest industry and state and federal agencies have involved road closures. The Blackfoot River Recreation Management Corridor is a prime example. A decade ago, recreationists and landowners along the river seemed destined for an ugly confrontation. Problems with littering and trespassing were mounting because of the rapidly growing popularity of the river for fishing and floating, and many landowners were threatening to close off access to this unique resource.

In a spirit of compromise, federal, state, and county agencies worked with corporate timberland owners, ranchers, and other rural property owners to develop a master plan for protecting the recreational integrity of a 26-mile stretch of the river. Designated the Blackfoot River Recreation Management Corridor, this section of river provides high quality recreation for thousands of people each year. The cooperative plan permits responsible public use while maintaining the natural characteristics of the river and upholding the rights of landowners along the river. Both Plum Creek Timber Company and Champion International have cooperated in management of the Blackfoot Corridor since its inception.

Plum Creek and Champion have also been involved in elk and bighorn sheep transplanting programs in western Montana, and land exchanges and lease arrangements to benefit wildlife or recreation. Plum Creek Timber Company recently prevented the subdivision of approximately 1,000 acres of prime elk and deer winter range in the Bitterroot Valley by purchasing the land, which will eventually be traded for other lands held by the U.S. Forest Service. Lorin Hicks, wildlife biologist for Plum Creek, points out: "A point often missed by the public is that forest product companies recognize the importance of wildlife to the people of Montana. Cooperative programs such as road closures, wildlife transplants, and land exchanges offer opportunities for agencies and companies to achieve multiple objectives."

In 1977, Champion International donated 74 acres of valuable recreational land on Salmon and Placid lakes to the DFWP for development as state recreation areas (see *Montana Outdoors*, July/August 1978). Negotiations are currently under way between Champion and the DFWP for a land sale, exchange, and lease arrangement that would allow development of a fishing and boating access site, campground, rifle range, and archery course along the Clark Fork River near Missoula.

Champion International, Plum Creek Timber Company, and St. Regis Paper Company all allow free public access for hunting and fishing on their lands in Montana. Champion's Jim Bentley speaks for all the companies when he says: "We are trying to be good neighbors and good stewards of the land. It is definitely worthwhile to help the cause of wildlife management through road closures, but we need better public understanding of the program so people will know it's in the best interest of the wildlife resource." ■

BILL McRAE

Elk Hunting, Logging and Tradition

by Terry N. Lonner

Most cultures have traditional values that go back hundreds, and sometimes thousands of years. Indeed, traditional values are the basis for many human activities.

Why are people so traditional in their beliefs and activities? The answer may be found in the first few lines of "Fiddler on the Roof":

> ...a fiddler on the roof. Sounds crazy, no? But in our little village of Anatevka, you might say every one of us is a fiddler on the roof, trying to scratch out a pleasant, simple tune without breaking our neck. It isn't easy. You may ask, why do we stay up here if it's so dangerous? We stay because Anatevka is our home. And how do we keep our balance? That I can tell you in a word—*tradition!*

MIKE LOGAN

Like Anatevka, Montana is the home of many who are trying to hold on to their traditions, and at the same time "to scratch out a pleasant, simple tune..." or put another way—to make a living.

Elk hunting, as we know it today, is a tradition for many Montanans. It is an activity often classified as outdoor recreation, and recreation (as defined by Webster) is "a refreshing of strength or spirits after work."

Hunting has not always been an ac-

tivity of recreation or tradition. Early America went through an era of "market hunting," but eventually the philosophy of English wildlife law was adopted. The cornerstone of that law is recognizing the chief value of wildlife as a source of recreation, rather than in the worth of a carcass.

Like other traditions, the importance of elk and elk hunting is not well-expressed through economics. Furthermore, American courts have established that wildlife, before capture, is either state property, or the property of *no one*, and after capture it cannot be legally marketed. The reason for this tenet is not only to keep wildlife public property, but also because of its aesthetic value.

So elk and elk hunting were not established to be economic commodities, but community property to be enjoyed by all and managed by certain government agencies such as state fish and game departments, the U.S. Forest Service, Bureau of Land Management, and the U.S. Fish and Wildlife Service. Ultimately, though, hunting and the management of land for elk and other wildlife is also the responsibility of every citizen.

The current distribution of elk in Montana is strongly connected with forested land. In recent years, slightly over 80% of all elk hunting in Montana has occurred on public land, mostly national forests. Consequently, management activities on and adjacent to these public lands have, and will continue to, "set the stage" for elk management and elk hunting opportunities.

Early (1900-1950) goals of increasing elk numbers and expanding their distribution were met. Between 1950 and 1960, Montana elk hunting regulations were liberalized, and 84% of the elk hunting units were open to either-sex seasons up to two months long. Those liberal seasons were necessary to achieve desirable harvests in rough, heavily timbered country. During the 1960s, extensive logging in formerly unroaded forests resulted in significant increases in access, with substantial reductions in timber (elk hiding cover). Combined with an increase in hunter numbers, this necessitated a trend toward more restrictive seasons to protect elk populations from overharvest.

Between 1960 and 1970, elk hunting seasons remained about the same length (35 days). But non-permit, either-sex elk hunting was reduced by 28%, with an additional 84% reduction during 1970-1980. These restrictive elk hunting regulations were as much related to increased reduction of habitat security on forested land as a result of logging as they were to an increase in hunters. While elk hunters afield have increased from 60,000 in 1960 to 90,000 in 1982—a 50% increase—timber harvest on national forests has increased threefold. (Most of the increase in hunters occurred between 1960 and 1970; only about 10% occurred from 1970 to 1982.) The accumulated timber harvest from 1950 to 1960 was 4.1 billion board feet, compared with an accumulated harvest of 12.9 billion board feet between 1960 and 1982.

Logging not only means at least a temporary reduction in hiding cover, but also permanent establishment of logging roads. In fact, once an area is logged, it may never again provide the security available before cutting, especially if it is managed on an "even aged rotation cycle" (clearcutting). This is particularly true for old-growth timber, well away from motorized traffic.

Concerns about elk management and logging in Montana are not new—studies have been conducted since the 1960s to assess effects of logging on elk. A major research effort, the Montana Cooperative Elk-Logging Study, began in 1970. Cooperators included: the Montana Department of Fish, Wildlife and Parks; Northern Region of the U.S. Forest Service; Intermountain Forest and Range Experiment Station—USDA Forest Service; School of Forestry, University of Montana; Bureau of Land Management (joined the second year of the study), and Burlington Northern Railroad—Timber and Lands Division (now the Plum Creek Timber Company), an ad hoc member. The effort comprised several study areas, with different habitat and climatic characteristics, elk populations, and logging practices. Recommendations have been developed to assist managers in planning and establishing timber sales that will at least reduce impacts on elk and elk hunting. They are directed at wild, free-ranging, hunted elk populations, and are not intended for refuges or artificial elk ranching operations. A summary of those recommendations follows:

Elk Winter Range

Because of the critical nature of productive elk winter range, any modification of timber stands should be planned on a site-by-site basis, emphasizing maintenance of adequate cover next to productive forage. During winter, human disturbance of elk should be reduced as much as possible, and slash cleanup and logging should not be done.

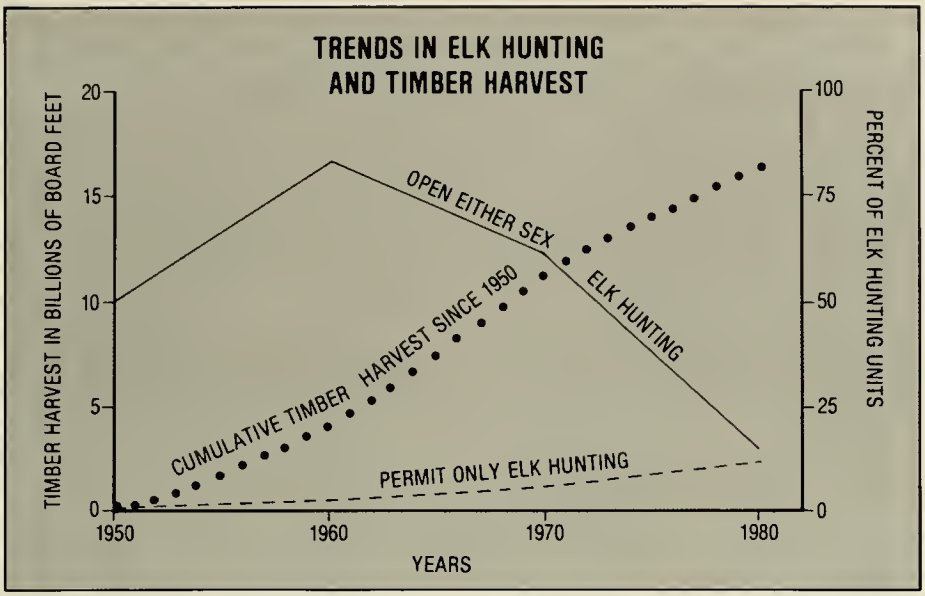
Winter conditions vary greatly across Montana. East of the Continental Divide, elk feed on grasslands and seek cover in adjacent timber. Snow depth is usually low to moderate and elk wintering in these areas may venture far from timber cover when undisturbed. However, when snow is deep, elk seek cover. Logging adjacent to grassland winter ranges will normally be detrimental to elk. Forage conditions on these ranges may be improved by range rehabilitation, grazing management, or prescribed fire.

The chance that logging will improve important and already well-used browse ranges west of the Divide is small. However, where winter range is already poor or declining, especially on shrub ranges, several management options exist for enhancing it. Timbered areas near primary foraging areas should be managed to provide cover, including larger trees. Where winter ranges are heavily forested and forage conditions are poor, the timber overstory can be removed in small patches to enhance forage production on south- to west-facing slopes. These openings should be planned so adjacent forest cover on benches and ridges provides cover and bedding sites.

Security during Logging

Timber sales on elk summer range should include planning to assure minimum loss of habitat security during road construction and logging.

Security for elk is any habitat in which the animals do not feel threatened or one in which they will remain even when disturbed. Land managers can reduce the distance elk have to move and, at the same time, increase the chance of immediate return by the animals displaced.



Some methods of doing this are:

—Disturbance by heavy equipment should be completed quickly, if possible during periods when elk are absent.

—Adjacent drainages or areas into which elk might be expected to move can be made more secure by road closures.

—Logging activity should be confined to a single drainage at a time, and all work completed quickly. Intensive activity over a single season influences elk far less than a low level of activity over consecutive seasons.

—Displacement of elk is significantly reduced where public motorized access to logging areas is limited.

Road Construction and Design

As part of the location and design of roads, existing habitat occupancy, movement patterns, and probable elk crossing areas should be identified and provisions made to provide security for unimpeded elk movement.

While any road reduces the security of existing elk habitat, certain considerations can minimize the loss:

—Permanent, high-volume roads should be located in those areas least used by elk. Location is less important for roads that will be closed.

—Both construction and layout of secondary roads should be done to make eventual closure easy. This is particularly important where roads enter drainage heads.

—Frequent dense cover should be maintained in areas adjacent to the road.

—Road construction should be avoided in saddles or low divides used by elk in crossing ridges between drainages.

—Roads should be constructed to the lowest standard that will meet management objectives. In important elk range, this usually means low-speed, single-track construction.

—Right-of-way slash should be dispersed so it does not inhibit elk movement.

—Roads, even temporary roads, should be located to avoid disturbance of moist sites and other areas of concentrated use by elk.

—Known areas of important winter range should be avoided if roads can be routed elsewhere.

Area Closures during the Hunting Season

Elk management goals and objectives should be clearly defined before imposing travel restrictions. Restrictions will: (1) increase the time spent walking by hunters and, as a result, increase the number of animals seen, and possibly increase the kill; (2) generally be accepted as providing a higher quality hunt, and (3) make retrieval of downed game more difficult.

Where cover is poor (one-third or less of the total area) and road densities are high (more than half a mile of road per square mile of area), restrictions will likely: (1) reduce harassment and emigration of elk; (2) reduce the early elk harvest but increase the uniformity of harvest throughout the hunting season, and (3) prevent high bull turnover rates that result in mostly spikes in the antlered bull population.

Where cover is good (at least two-thirds of the total area) and open road densities are low (less than half a mile of road per square mile of area), restrictions probably won't influence elk distribution and harvest very much. Where possible, elk seek security at least a mile from open roads.

Elk/Cattle Relationships

The effects of every proposed timber sale on elk and livestock management should be evaluated. Such evaluations should include a high priority for obtaining baseline information on existing elk use. Cattle using newly logged areas, previously used by elk but not by cattle, should not be encouraged.

Road construction and other activities associated with timber harvest occasionally "open up" new areas for grazing or alter existing cattle grazing allotments on elk summer ranges. This increases the potential for elk/cattle interaction. Allocation of area may be more practical and ecologically sound than allocation for forage.

Clearcuts

Clearcuts are not clearly beneficial to elk, although forage production is increased in openings. But neither are clearcuts detrimental to elk if the opening can be developed without reducing overall habitat security. To assure that forage produced in clearcuts is, in fact, available for use by elk, openings should satisfy the following criteria:

—Cleanup inside clearcuts should reduce the average slash depth to below 1½ feet; slash deeper than that reduces elk use by at least 50%.

—Elk seem to prefer small openings, but openings up to 100 acres may be acceptable when adjacent forest provides adequate security.

—In western Montana, vegetation provides some security in older openings, but in central Montana, elk prefer the younger openings, so security should be provided by designing clearcuts so the best cover is available at the uncut edge. Thinning

adjacent to clearcuts is not recommended.

—Appropriate road closures can provide additional security, which will significantly increase elk use of clearcut openings.

Cover Type

In determining elk use of an area, cover type, or existing vegetation, is often more important than habitat type, or the potential of a site to grow certain kinds of vegetation. Management efforts for both timber and elk should recognize the importance of distinguishing cover type from habitat type. In so doing, important or key areas for elk must be identified on a site-by-site basis.

Road Management

Where maintaining elk habitat quality and security is important, every road should be carefully evaluated to determine its effects on elk and the possible consequences of leaving it open.

Roads—and the people and traffic associated with them—more significantly influence elk security than most other factors combined. Few considerations in habitat management appear to provide a better opportunity for positive influence in managing elk habitat than road closures. It is recognized some roads are needed for timber harvest, recreation, fire control, firewood cutting, and a variety of other purposes, including access by hunters.

Moist Sites

Moist sites are an important part of elk summer range; these sites, as well as others heavily used by elk, should be identified. An area large enough to maintain the overall integrity of these habitats should be determined by on-the-ground inspection. Leaving some of these areas untouched and protecting peripheral zones to provide continuous cover with the uncut forest will benefit elk. New or planned roads passing near these sites should be closed to summer-fall vehicular traffic, except perhaps for light, intermittent administrative use. Roads near moist areas should be evaluated closely for travel restrictions.

Moist sites are important as forage areas and for the cooling effect they provide to elk. They become more critical during dry summers when precipitation from the previous winter and early spring (October through May) approaches 25% below normal. During such years, elk will benefit if land managers shift human activities and livestock grazing away from moist sites, particularly in areas with little moist summer range. These habitat types produce highly nutritious forage which is consumed by elk before the breeding season. Nutrition obtained by elk at this time is a significant factor in reproduction. Also, animals that build high fat reserves during summer are more likely to survive severe winters.

Traditional Home Range Use by Elk

Before timber sales are established and new roads constructed, knowledge should be acquired concerning traditional elk use patterns and distribution of the elk harvest. Then, timber cutting can be timed and roads placed to have the least adverse effect on both elk and elk hunting.

Roading and logging of an area with high traditional elk use could lead to undesirable overharvest and a severe decline of the herd if hunting and/or road closures are not adjusted to compensate for the reduced habitat security. This may be especially true if traditional elk use perseveres in spite of disturbance and habitat alteration.

Biologists speculate that habitat preference is learned as well as inbred. Learned preference may be as important in elk habitat management as inbred preference and, like inbred preference, could be influenced by harvest rate of adult cows. If hunting, over time, continually reduces the size of an elk herd that traditionally uses a particular area, elk use of that area may cease.

Furthermore, elk are slow to pioneer (to immigrate on their own) and become established in new areas. Once they are eliminated or the population is reduced to a low level, it may take many years for an area to again have high elk use. Close monitoring of elk harvest rates in conjunction with forest treatments is necessary to prevent the decline of traditional elk use of an area.

Conclusion

Montana's economy is based primarily on use of the land by agriculture, ranching, mining, logging, and land development. Although any or all of these activities are not necessarily detrimental to elk habitat, they are causing changes in the land, its resources, and some of our traditions. One of these traditions is elk hunting—and it may be important to recognize elk hunting as a tradition without further explanation. Why? Look again to "Fiddler on the Roof":

> ...Because of our traditions, we've kept our balance for many, many years. Here in Anatevka, we have traditions for everything—how to eat, how to sleep, how to wear clothes....You may ask how did this tradition start? I'll tell you—I don't know! But it's a tradition.

Tradition, then, may be an important stabilizer of society, but maintaining the continuity of some of these traditions—such as elk hunting—in our rapidly changing society is often difficult. Application of the research results as summarized above, combined with intelligent natural resource management and a commitment from concerned people, will reduce this difficulty. This can happen without undue hardship on other resource development. Then, the probability that Montana elk hunting, as it exists today, will become just another chapter in some history book, will be at least delayed.

Montana must continue to make its contribution to the colorful kaleidoscope of tradition in this country. If Idaho were stripped of its famous potatoes, if Washington's salmon vanished, if the tide permanently docked Louisiana's shrimp boats, if the surfers were banished from California's beaches, and if Montana elk and the hunting recreation they provide become only a memory, we would suffer profound losses. A homogeneous country, with few regional variations in tradition, would be deadly boring. Montana needs its elk and other wildlife. They should be protected, cherished, and intelligently managed for Montanans and others to enjoy. ■

Contributors

• Although they are "Just Passing Through" Montana during their annual migrations, the sight of 200,000 to 350,000 white geese is bound to inspire awe. As **Don Childress** writes: "The waves of geese seem almost endless as they make their descent to the marsh. The accompanying noise is as spectacular as the numbers...." The din is a fitting accompaniment to their arrival at Freezout Lake Wildlife Management Area. Childress is the manager at Freezout and also statewide waterfowl coordinator. His article opens this issue, on page 2.

• Someone who has been an alpine skier for 16 years and a Nordic skier for more than eight is a suitable author for "Out on the Tracks." **Doug Monger** explores Montana's ski touring centers, which can add a new dimension to the world of ski touring. Trained instructors, equipment rentals, maintained trails, information on conditions, rustic accommodations, good food—the centers offer a complete package that makes even Montana's winters seem not long enough. Monger is a park manager for the department in Bozeman. Turn to his article on page 6.

• It's hard to believe that more water leaves Montana via the Clark Fork than from either the Missouri or Yellowstone. But it's a beleaguered river, one that has endured the consequences of "over 100 years of intensive mining and smelting activity near its headwaters." Turn to **Glenn Phillips'** "A Clark Fork Prognosis" on page 8. Phillips is the department's pollution control biologist.

• **Mike Aderhold** continues his profiles of "More Folks Behind the Badge." These "folks" are the department's law enforcement officers, and they meet the challenges of their jobs in diverse, interesting ways. In this issue, Aderhold profiles Dave Cooper, Plentywood; Ron Carlson, Big Timber; Dennis Rush, Malta; Jim Conner, Polson; Guy Shanks, Bigfork, and Lou Kis, Kalispell. Their stories start on page 15. Watch the March/April 1984 issue for part three of Aderhold's article. He is the department's information officer for the Kalispell region.

• **Clif Youmans'** interest in pocket gophers stems from two summers of graduate research on them in the Pelican Valley of Yellowstone National Park. But you needn't visit the Pelican Valley to see pocket gophers—they are found throughout Montana. For the most part, their burrowing activity is useful because it aerates range soils. In fact, a single pocket gopher may move five tons of oven-dry soil per year, thus earning it the name, "Nature's Plowshare." Youmans is a private consultant with ECON, Inc., and is currently studying the population dynamics of owls in southeastern Montana. His article begins on page 19.

• **Jimmy McVicar Lotan's** article is proof that there are some characters left. That years of packing horses and mules, miles of mountain travel, and constant contact with high ridges, clear mountain streams, aspen groves trembling in the breeze, and remote cirque basins somehow leave their mark. They leave their mark on a "wrinkled-up, old" packer who would never admit to enjoying his trade. And they leave their mark on a father and his sons in a successful finale to an "Interlude on Wilson Creek." A research forester for the Forest Service's Northern Forest Fire Lab in Missoula, Lotan is also an avid black powder and buckskinning enthusiast. Turn to his article on page 21.

• **Hazen Alkire** is best known for his depictions of "western realism." The front cover illustrates why. It enables the reader to see, and almost experience, the components of an "Interlude on Wilson Creek." A native Montanan, Alkire's paintings come from his experiences. Having worked on ranches, trapped, and hunted most of his life, his experiences provide him with deep insight and understanding of the West as it is today. He works from his studio at 1445 Wicks Lane; Billings, MT 59105 (406/259-0325).

• Montana taxpayers will have a chance to make their mark for nongame wildlife. It's a matter of checking a box on the Montana income tax form and contributing $2, $5, or $10 to Montana's nongame program. As **Betsy Spettigue** suggests, beginning on page 24, "Do Something Wild...Share With Wildlife." The nongame checkoff has been successful in other states—for example, taxpayers in Colorado have contributed over $3.5 million since the checkoff began in 1976. Spettigue is the department's information officer in Helena.

• Writing about **Charles W. Schwartz** in a single paragraph can't be done. There's not enough space to even highlight his contributions to wildlife biology and research, filmmaking, art and illustration, literature. How about this: He was the illustrator for the first edition of Aldo Leopold's "A Sand County Almanac." That's only one of hundreds of distinctions he's earned, hand in hand with his biologist wife, Libby, with whom he co-authored "The Wild Mammals of Missouri." Both have "retired" from careers that began in the 1940s with the Missouri Department of Conservation. They now spend part of the year in Coeur d'Alene, Idaho, and the remainder in Missouri. A collection of Charlie's "Wildlife Drawings" has been published by the Missouri department; the beautifully done, coffee-table volume is available for $12 from: Outdoor Library, Missouri Department of Conservation, P.O. Box 180; Jefferson City, MO 65102.

• **Shirley Johnson's** love of wildlife and the outdoors is easy to spot in her work, and in her back cover painting of calliope hummingbirds in this issue. We appreciate her contribution to the department's nongame effort. Her studio and home are not far from the Rattlesnake Wilderness Area near Missoula, and many of her subjects are painted from her studio window. She has completed a series of limited edition prints, "The Endangered Ones," and just earned a commission from the Boy Scouts of America to do a series on scouting. The last time such a series was commissioned, it was done by Norman Rockwell. For additional information about her work, contact her at: #6 Greenbrier Dr., Lincoln Hills; Missoula, MT 59802 (406/728-8119).

• It's the season for elk hunting. And it's also the season for tradition. Two articles in this issue combine the two subjects. In "Elk Hunting, Logging, and Tradition," **Terry N. Lonner** explains the recommendations of the Montana Cooperative Elk-Logging Study, and examines the effects of logging on hiding cover for elk. Turn to page 27 for Lonner's article. On page 32, **Fred J. King** looks at the "Gallatin and Gardiner Late Season Hunts: Yearly Traditions." He explains the need for such late season hunts, and answers many of the questions hunters have about them. Lonner is a research biologist with the Wildlife Division Research Bureau in Bozeman; he has been on the research committee of the Elk-Logging Study since 1972. King is responsible for the maintenance and development of six department-owned wildlife management areas in southwestern Montana; he lives in Gallatin Gateway.

• *Montana Outdoors* appreciates the contributions of the following photographers: **Harry Engels** and **Larry Thompson**, Helena; **Michael Francis**, Tallahassee, Fla.; **John P. Kelly**, Basalt, Colo.; **Cliff Montagne**, Bozeman; **Alan Nelson**, Great Falls; **Jim Romo**, Corvallis, Ore., and **George Wuerthner**, Missoula.

Gallatin & Gardiner Late Season Hunts

YEARLY TRADITIONS

by Fred J. King

Gallatin and Gardiner are places as familiar to elk hunters as Ford and Buick are to car owners. Porcupine, Buffalo Horn, Eagle Creek, Deckard Flats, Taylor Fork, Tepee Creek, Cow Flats, and Little Trail Creek are drainages and reference points that become common terms to hunters and wildlife managers as they talk about elk movements and successful hunts.

Why have these hunts—once the center of much controversy—become so popular with hunters? The answer probably lies with the term "success"—success not only for the sportsman but also achievement of the department's goals of providing additional hunting opportunity for sportsmen, and perpetuating healthy elk herds and quality habitat to sustain those herds for the future.

To understand the need for late season hunts, one must know the characteristics and migratory activities of the Gallatin and Gardiner herds. Each herd spends most of the late spring, summer, fall, and part of winter in Yellowstone National Park. The park, of course, is not open to hunting. Generally, insufficient snow accumulates during the general hunting season to move significant numbers of elk from the park into nearby hunting areas out of the park. Consequently, it is hard to harvest animals. Elk populations build up and put unnecessary pressure on available winter forage when they finally move from the park's security. For these reasons, management of the two herds cannot be the same as for populations of elk available to hunters throughout the general big game season.

Arnold Foss, Department of Fish, Wildlife and Parks wildlife manager for the Bozeman region, sums up the need to harvest migrating elk from Yellowstone National park: "The primary emphasis of this elk management program is to maintain productive winter habitat for the elk herd. This can be accomplished only by maintaining a healthy soil and vegetation resource. Maintaining this resource is possible only by annual reductions of surplus elk, a concept practiced and accepted for all elk populations in the State of Montana."

With that basic philosophy, the practice of late hunting seasons after major migrations have taken place was begun. The late season hunts have now become a yearly tradition for approximately 4,000 elk hunters.

Sportsmen who participate in the late season Gallatin and Gardiner hunts will find these hunts are now well-controlled and regulated. Their main purpose is to harvest elk, but the department must also be responsible for providing a quality—and safe—experience. In the past, both areas were open to an unlimited number of hunters. The combination of concentrated elk and concentrated hunters created many unpalatable and unsafe situations. Now, there are a limited number of permits issued, permits are validated at permanent check stations, hunters are assigned two-day hunting periods and also may be assigned to subunits, enforcement efforts have increased, and snowmobile, and other vehicle use is more closely controlled. In addition, the Gallatin hunt can be closed on 48-hour notice if the desired elk harvest is reached. Because of these changes, the hunts have gained in popularity, while allowing the harvest to occur in a more responsible manner.

An example of a restriction par-

DAVE BOOKS

ticipating sportsmen support is snowmobile use. If hunters were allowed to use snow machines for hunting, the mobility and speed of the machines would put the elk (and some other hunters) at great disadvantage and possibly create unsafe situations for hunters. Therefore, snowmobile use in both areas is limited to retrieval, between noon and 6 p.m., and no firearms can be carried on snowmobiles. Hunters seeem to realize this restriction increases their success in the long run, and that it is the most ethical way to conduct their activities.

Similarities and differences mark the two late season hunts; the following sections describe each area separately and enable interested hunters to see what each has to offer.

GALLATIN

Location

Located against the northwestern corner of Yellowstone National Park, U.S. Highway 191 takes the hunter to seven of the eight hunting subunits. These areas are approximately 45 to 65 miles south of Bozeman. Access from U.S. 191 is basically walk-in, except for a county road leading into Taylor Fork drainage (Subunit 2) to specific parking areas. From these parking areas, hunters must walk or use horses.

Subunit 8 lies in the Madison drainage. Take U.S. Highway 287 south from Ennis to the small community of Cameron; then travel east on improved county roads to three access points at the Bear Creek Wildlife Management Area. From there, hunters must hike.

Weather

Prepare for the worst. Chances are good you will run into below zero temperatures, deep snow, and blizzard conditions. Elevation in the hunting areas ranges from 6,000 to 10,000 feet, with most of the elk activity below 8,000 feet due to the heavy snow conditions at higher altitudes.

Gallatin Check Station

Permit holders are required to stop at the check station, six miles south of Gallatin Gateway, to have their permits validated. Permits can be validated no earlier than 24 hours before the two-day time period assigned and marked on the permit. Hunters must show the check station attendant their special permits and an unused elk tag. The name on the permit and tag will be checked against a computer printout. The hunter will then be assigned to a hunting subunit. Once the paperwork is out of the way, the check station attendants can provide further information. Allow plenty of time to go to the hunting unit to glass for elk, and also to talk to other hunters. Keep in mind that some of the subunits will be open only to a limited number of hunters on a first-come, first-served basis. Permit holders who arrive early will have a wider choice of units.

The check station also offers maps, updates on weather and road conditions, hot coffee, and information on how the hunt is going. If you are coming from far away, you can call ahead to the check station for information: 406/763-4635.

Both successful and non-successful hunters must stop at the check station at the conclusion of their hunt.

Guides, Lodging, Food, Camping

In the Bozeman, Ennis, West Yellowstone, and Gallatin Canyon areas, many guides and outfitters are available to handle hunters' needs during the late season. Hunters should consult "Montana Outfitters" (this directory is free from the Law Enforcement Division, Department of Fish, Wildlife and Parks, 1420 E. Sixth; Helena, MT 59620, 406/449-2452).

Lodging and food are available in Bozeman, Ennis, and the Gallatin areas. Hunters should make motel reservations early since units closer to the hunting areas fill up rapidly. The area also has many public and private campgrounds.

Equipment

Take some time and completely clean the rifle you plan to use. Remove all dirt, grease, and grime from moving parts, especially around the firing pin, since extreme cold during the late season hunts has caused many rifles to freeze up and become unusable.

Chances are, you will encounter some deep snow, so bring snowshoes, especially if your permit begins during one of the later time periods. Some hunters use cross-country skis; they are good for open country, but snowshoes are probably more versatile because they can be used both in meadows and timber.

Hunting by horseback is popular, but hunters should remember that deep snow and icy creeks can be dangerous. Before hauling your horse to the late hunt, call the check station to ascertain snow conditions.

Framework of the Hunt, Hunter Success

Identified as 310-03 on the 1983 big game hunting map, opening day of the 1983-84 Gallatin late season will be Dec. 16, 1983. If run to completion, it will end Feb. 13, 1984. A total of 1,675 either-sex permits were issued for this hunt; the application deadline was June 15, 1983.

Since the hunter is the tool wildlife managers use to harvest these elk, control of numbers of hunters and their distribution determines when the harvest of elk occurs and affects how many elk are to be taken.

Friday-Saturday and Sunday-Monday are open for hunting. Tuesday, Wednesday, and Thursday are closed to hunting to allow elk to redistribute and enable wildlife managers to evaluate progress of the hunt.

Hunter success is relatively high for the Gallatin late hunt; the following table presents five years of late season information:

Gallatin Late Season Hunt

Season	Number of permits available	Number of hunters validated	% Validated	Total elk harvested	(% Bulls in harvest)	Hunter success	Quota
1978-79	2,800	1,658	(59%)	248	(39%)	15%	850
1979-80	1,750	1,006	(58%)	249	(23%)	25%	350
1980-81	1,750	979	(56%)	134	(51%)	14%	600
1981-82	1,500	934	(62%)	361	(43%)	39%	600
1982-83	1,675	863	(52%)	296	(26%)	34%	600

As already mentioned, the hunt can be closed on 48-hour notice; in fact, the 1982-83 late season hunt was closed before the last two time periods came up.

Every year, department biologists determine a reasonable quota of elk to be taken, and the recommendation is acted upon by the Fish and Game Commission. Determination of this quota is based on a variety of considerations, including carrying capacity of the winter range, annual calf production, percentage of bulls in the herd, and present elk numbers in the upper Gallatin area. Elk harvested in Hunting District 310 before the start of the late season count against this quota.

To illustrate, before the general hunting season in 1982 began, biologists determined that a quota of 600 elk could be taken from H.D. 310. Hunting in the upper Gallatin in the 1982 general season was very good, and 320 elk were checked through the Gallatin Check Station. This left 280 elk to be harvested during the 1982-83 late season, and this quota was met before all hunting periods could be run out. Hunters who did not get to hunt are not given any priority for receiving a permit the next season. Termination of the hunt early is a chance the hunter takes when applying for the late season.

Archery Area

Another unique feature of the late Gallatin hunt is a special bow hunting area. The archery area was created in the 1973-74 late season and initially contained about 2½ square miles. The archery area was increased during the late season of 1980-81 to include the north side of the Porcupine drainage, an area of approximately 15 square miles.

Participation in the archery hunt is a simple procedure; hunting and harvesting an elk is another story. Validation for the archery area takes place at the Gallatin Check Station. The archer must produce his or her unused elk tag and a valid archery stamp. A free permit is issued and a map of the hunting area provided. The permit allows the archer to hunt any day of the week for the duration of the hunt. Check station attendants will be able to offer suggestions about where to look for the elk.

Hunting with a bow and arrow under winter conditions presents a challenge to the archer. Since bull elk do not respond to a bugle or call as they would during the rutting season, hunting must be done by stalking or finding a crossing and waiting for an elk to come by. Hunting is for either-sex elk, and camouflage can be used. Needless to say, white is the best color.

Since the archery season began during the late season of 1973-74, 1,428 archers have been validated. These archers have harvested 12 elk. During the 1982-83 season, 303 archers were validated and they harvested four elk.

Any elk harvested by archers also count against the quota; if that quota is met, the archery season is closed along with the rifle season.

The following table provides information about five years of late archery hunting in the Gallatin.

Graham Taylor, department wildlife biologist working with the Gallatin elk herd, points out that control of the herd by the late season hunt has been instrumental in maintaining the quality of the soil which produces the vegetation which, in turn, maintains the quality and productivity of the elk herd. In future years, it will not only be necessary to control the herd size and monitor the quality of the vegetation, but it will be extremely important to perpetuate the existing habitat base that supports all seasonal activities of these elk. With these goals in mind, elk will continue to be part of the picture in the upper Gallatin.

Gallatin Late Archery Season

Season	Number of archers validated	Number of elk harvested
1978-79	109	1
1979-80	68	0
1980-81	123	0
1981-82	295	3
1982-83	303	4

GARDINER

Gardiner, Mont.—rich in wildlife, especially during the winter—serves as a focal point for 2,400 permit holders who have been successful in drawing a late season permit. Approximately 1,536, or 64% of them, will turn out for the hunt. Those who show up will participate in what is possibly Montana's most successful elk hunt. As in the Gallatin, snow and weather conditions control movement of the elk, size of the herd, and ultimately, hunter success.

For example, the 1980-81 winter was mild with moderate temperatures and little snow during the late season hunt. As a result, elk did not forage at the lower elevations outside Yellowstone National Park. Elk that migrated out of the park dispersed and became less available to hunters. During the 1980-81 season, the department issued 2,550 permits for the hunt; 1,109 (43%) permits were validated, and 126 elk were harvested (11% success). Contrast those figures with the 1982-83 Gardiner hunt where wintering conditions were a little more severe and elk moved out of the park. During the 1982-83 season, 2,400 permits were issued; 1,737 (72%) of the permit holders turned out, and they bagged 1,353 elk (78% success).

Location

Identified on the 1983 hunting map as Hunting districts 313-02 and 313-03, the five subunits that make up the late Gardiner hunt lie adjacent to the town of Gardiner and extend 30 miles north of the town and Yellowstone National Park boundary.

Gardiner is about 60 miles south of Livingston. U.S. Highway 89 is the main access to Gardiner, and the heart of the hunting areas. From there, improved and unimproved roads and trails offer further access to parking areas and trail heads.

Weather

The area around Gardiner is big game winter range. Lower elevations near the 5,200-foot level (including the town of Gardiner) remain relatively free of snow. At elevations of 7,500 feet and higher, snow deepens and travel becomes more restricted. Snowshoes are necessary for the hunter on foot. Weather changes rapidly and cold temperatures with high winds are common, so it is important for hunters to dress for the worst and carry basic survival equipment.

From the deep gullies of Bear Creek, to the top of Dome Mountain, a variety of topographic challenges face the Gardiner elk hunter. During the day, elk can be found bedded down in heavy timber; early in the morning, they are more likely to be found in sagebrush. A hunter can pick the type of terrain that suits his physical ability.

Gardiner Check Station

First and last stop for permit holders is the Gardiner Check Station. Located 25 miles north of Gardiner at the Point-of-Rocks Cafe, signs along U.S. Highway 89 alert hunters as they approach it. As in the Gallatin, permit holders must stop at the check station and show attendants their permit and unused elk tag. Hunters will either be given a choice of units or assigned to one of five subunits within the late hunting area.

Both successful and non-successful hunters are required to stop at the check station when they are through hunting. Information gathered at the check stations helps guide future

Chances of Receiving a Late Season Gallatin or Gardiner Permit

Since there are only a limited number of permits for the late hunts, interested sportsmen must apply and be successful in the drawing to receive a permit. One question frequently asked department personnel is: "What are my chances of drawing a permit?"

The following charts will provide up-to-date information for the permits available and the number of applications received for the 1983-84 late season Gallatin and Gardiner areas.

Gallatin Late Season

Hunting District 310-03

Number of permits: 1,675

Number of applications

	1st choice	2nd choice	3rd choice	Total
Resident	2,055	2,977	3,196	8,228
Non-resident	402	511	262	1,175
TOTAL	2,457	3,488	3,458	9,403

Successful applicants

	1st choice	2nd choice	3rd choice	Total
Resident	1,508			1,508
Non-resident	167			167
TOTAL	1,675			1,675

Gardiner Late Season

Hunting District 313-02

Number of permits: 800

Number of applications

	1st choice	2nd choice	3rd choice	Total
Resident	6,522	5,086	2,667	14,275
Non-resident	930	517	192	1,639
TOTAL	7,452	5,603	2,859	15,914

Successful applicants

	1st choice	2nd choice	3rd choice	Total
Resident	720			720
Non-resident	80			80
Total	800			800

Hunting Districts 313-03

Number of permits: 1,600

Number of applications

	1st choice	2nd choice	3rd choice	Total
Resident	3,375	5,334	3,697	12,406
Non-resident	130	324	367	821
TOTAL	3,505	5,658	4,064	13,227

Successful applicants

	1st choice	2nd choice	3rd choice	Total
Resident	1,536			1,536
Non-resident	64			64
TOTAL	1,600			1,600

management recommendations for this migrating elk herd. For example, biologists gain information about location of individual elk, age, sex, antler length, and general condition of the animal.

Check station hours are from 5 a.m. to 9 p.m., and hunters can have their permits validated no sooner than 24 hours before the start of their two-day time period. Hunters coming from far away should call the check station at 406/848-7269 beforehand to find out road and weather conditions in the hunting units.

Guides, Lodging, Food, Camping

Gardiner specializes in dealing with needs of people on the move. Cafes, gas stations, and motels are open during the late hunting season. It is wise to make lodging reservations early; however, if Gardiner is filled up, Livingston is another option. Between Livingston and Gardiner and closer to the hunting units, Chico Hot Springs and Point-of-Rocks offer both lodging and meals.

If a hunter wants an outfitter, there are many from whom to choose in the Gardiner area. For a listing, consult the "Montana Outfitters" directory mentioned earlier. Contact a prospective outfitter well ahead of the hunt.

Both public and commercial camping can be found for hunters who want to bring their own units for sleeping and cooking.

Framework of the Hunt, Hunter Success

For 1983-84, 2,400 permits were available to hunters applying for the Gardiner late hunt. Eight hundred were for either-sex hunting, and the remaining 1,600 were for antlerless elk. In August 1983, successful applicants were sent a permit with an assigned time period. The times are assigned in the order drawn, and the permit is good only for that assigned time.

Elk hunting for the first two time periods will begin Dec. 9 and Dec. 16, 1983. Permits for the first two time periods will be valid for four days (more time is allotted to the December hunters since elk may not have migrated from the park in any great numbers). Starting Dec. 30, the permits are valid for two-day time periods only. Hunting will take place just as in the Gallatin—either Friday and Saturday, or Sunday and Monday. Tuesday, Wednesday, and Thursday are closed to hunting, and the season will end Feb. 13, 1984.

Unlike the Gallatin, there is no quota; once the hunt begins, it goes for the full time. However, the five subunits can be opened or closed, limited to a certain number of hunters, or hunters can be assigned to more than one unit, depending on elk availability and location.

Especially for the hunter new to the area, it is beneficial to scout the area and become familiar with roads and drainages.

The following chart provides information about success over the past five late season hunts:

Gardiner Late Season Hunt

Season	Number of permits available	Number of hunters validated	% Validated	Elk harvested	(% Bulls)	Hunter success %
Feb. 1-20, 1978	1,500 either sex	937	(63%)	767	(47%)	82%
1979-1980	1,000 either sex	643	(79%)	467	(61%)	73%
1980-1981	1,700 either sex 850 antlerless 2,550	1,109	(43%)	126	(56%)	11%
1981-1982	1,600 either sex 800 antlerless 2,400	1,457	(61%)	1,016	(45%)	70%
1982-1983	1,600 either sex 800 antlerless 2,400	1,737	(72%)	1,353	(34%)	78%

The seasonal migration pattern to and from Yellowstone Park is common to both the Gardiner and Gallatin elk herds. Timing of these movements corresponds with the severity of winter conditions, availability of forage, size of the elk herds, and the quality of forage on winter ranges within the park.

But there are also differences between the two herds. For example, most of the winter range for the Gardiner herd lies within the boundaries of Yellowstone Park, while most of the winter range for the Gallatin herd is outside the park.

There are also differences between the size of the herds, weather patterns, and general topography in which the elk live. These differences account for varying management approaches and the framework for the hunts in the two late season areas.

Jon Swenson, wildlife biologist for the department working on elk in the Gardiner area, commented on the future of the late Gardiner hunts: "As hunters will notice, changes in the number and kinds of permits have been made this year. Changes have also taken place in the opening and closing dates and boundaries of the subunits during the last few years. For example, the 1983-84 late season will again have 2,400 permits; only this year, 800 permits will be valid for either-sex hunting, and 1,600 permits will be valid for antlerless elk. This switch from the previous two years is an effort to place more of the hunting pressure on the cow segment of the herd. These sorts of refinements of the hunt are necessary, and in the future, other changes will occur. The department is determined to perpetuate this hunt, and permit holders can continue to count on high success when the elk migrate from Yellowstone Park."

If you decide you might want to consider one of these hunts in the future, you should be aware the number of applications has been increasing. For example, in Hunting District 313-02 (one of the subunits in the Gardiner late hunt), 7,452 persons applied for the 800 permits (see chart). Still, these permits can extend hunting opportunity and expose you to a different sort of hunting situation in two beautiful areas. Hunters who have applied for and received permits will probably want to continue what has no doubt become a yearly tradition. ■

A Clark Fork Prognosis
continued

marked for the reclamation of abandoned mine sites. The fee varies from 10 cents to 35 cents per ton, depending on the quality of the coal and if the operation is surface or underground.

Montana's program, administered by the Department of State Lands (DSL), accrues about $5 million per year (see "Remedies for Left-Behind Mines," *Montana Outdoors*, July/August 1983). Areas eligible for these funds include the Colorado Tailings along Silver Bow Creek near Butte. These tailings, probably dumped along the creek in the late 1800s, contribute significantly to the metals load in the creek. According to Ben Mundie, reclamation specialist with DSL, "Consent for right of entry forms were signed in December 1981 [by the Anaconda Minerals Co.], and plans were formulated for removal of the Colorado Tailings from Silver Bow Creek. [However,] with the eligibility determination of Silver Bow Creek for Superfund monies, the Montana [Abandoned Mine Land] AML Program was precluded from any reclamation involvement on Silver Bow Creek." Thus, the AML Program can only wait and see if and how Superfund funds are allocated. Adding to the doubt that AML funds will be used in Silver Bow Creek is a recent decision that coal mine reclamation will take priority over hard-rock mine sites.

Montana Water Quality Act—This act, administered by the Water Quality Bureau of the Department of Health and Environmental Sciences (DHES), requires industries to apply for and obtain a permit before discharging wastewater into any state water. Each permit limits discharge; monitoring ensures that conditions of the permit are upheld.

The Anaconda Minerals Co. holds two discharge permits, one for the Warm Springs ponds and a second for its Butte operation. The ponds receive water from Silver Bow Creek which, in turn, receives wastewater from both the Anaconda smelter and the Butte facility. In the past, the company has sometimes been unable to meet discharge limitations for copper and zinc. A new permit recently negotiated will require the company to submit a schedule for further compliance.

Since closure of the Berkeley Pit, the discharge at Butte has ended and the company intends to dry up the discharge at Anaconda as well. While the thought of reduced waste discharges appears encouraging, metals still leach from tailings piles near the creek. More important, however, is the question of responsibility for continued treatment of the water. Anaconda Co. representatives have indicated that elimination of their discharge will relieve them of responsibility for continued treatment. Without liming, water quality of the upper Clark Fork will worsen. In a recent report prepared by Dr. Rodney James for the DHES, it is estimated that it would take nearly 350 years for all of the metals to leach out of the system. The question of liability for treatment will revolve around whether the company is judged responsible for tailings in the stream corridor.

Montana Water Use Act—This act provides the means for reserving a portion of the instream flow of water for fish and wildlife. However, an instream flow reservation has not been obtained for the Clark Fork; thus, the river has no protection against dewatering.

As flow is reduced, the amount of suitable habitat available for fish production is diminished. If flows become low enough, water temperature may increase and dissolved oxygen concentrations lower; both conditions create additional stress on fish and limit their growth and production. An added advantage of adequate stream flow is dilution of industrial and domestic wastes. For example, reserving the flow of water from tributaries located downstream from the sources of metals in the Clark Fork will ensure that a maximum level of dilution is realized.

The Department of Fish, Wildlife and Parks is reviewing the information necessary to support an instream flow reservation for the Clark Fork. While a reservation is a step in the right direction, it can only be viewed as part of the solution to a very complicated problem.

Discomforting as it may seem, the programs and legislation available to deal with the Clark Fork do not guarantee that the quality of water in the river will be improved or even upheld once mining interests have left. While it is unrealistic to believe that the river and its valley will ever again approach the pristine condition so beautifully described by Lt. Mullan's party only 130 years ago, one would like to believe that it is equally unrealistic to allow the river to revert to the days of red water and fish kills.

A well-conceived restoration and water management program could eliminate the threat of metals in the upper Clark Fork and return to the river some of the dignity it once enjoyed. One thing cannot be disputed: A healthy Clark Fork River is a worthy goal and, if achieved, would represent a landmark accomplishment for both government and industry. ■

Brown
Imprinted
Neat
Dandy
Efficient
Rich-looking

Our binder is brown, imprinted with snazzy gold letters that say "Montana Outdoors."

It's a neat, dandy, and efficient way to keep a year's magazines, all together, all in one place.

The cost of such a rich-looking binder will not make you poor. For each personal or gift order, send $5 to: Montana Outdoors, Department of Fish, Wildlife and Parks; Helena, MT 59620.

By checking a box on your Montana income tax form, you can help fund nongame education and research. Do Something Wild. . . Share With Wildlife!